R-10R50(W)
R-10R50(B)

SHARP® SERVICE MANUAL

SY927R10R50HW

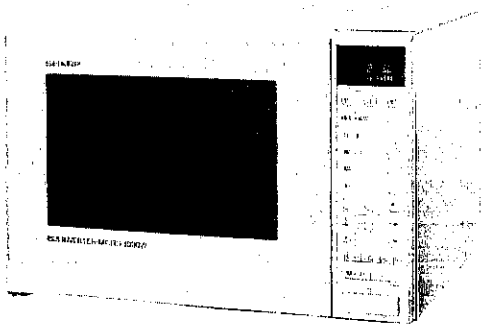

Photo R-10R50(W)

GRILL AND CONVECTION MICROWAVE OVEN

MODEL R-10R50(W)

In interests of user-safety the oven should be restored to its original condition and only parts identical to those specified should be used.
(RD16101U)

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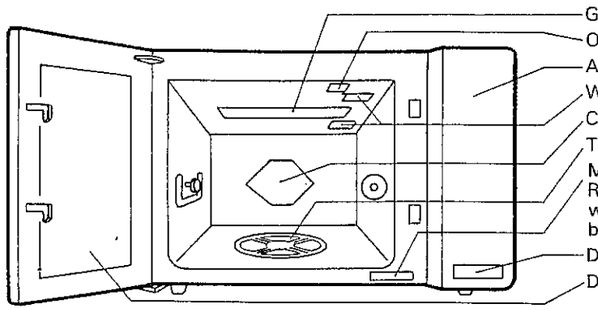
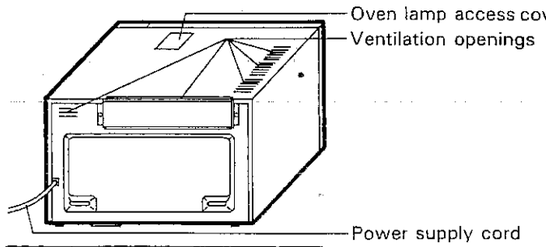
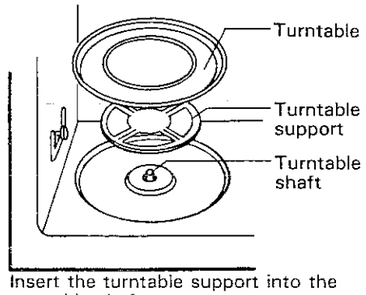
SHARP CORPORATION

APPLEANCE VIEW

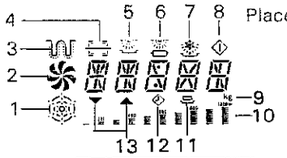

Grill heating element
Oven lamp
Auto-Touch control panel
Waveguide cover
Convection heating element
Turntable support
Menu sticker for Easy Defrost and Easy Reheat. This is not sticked. So if you want to stick this, this sticker should be sticked at this position.
Door open button (▽)
Door





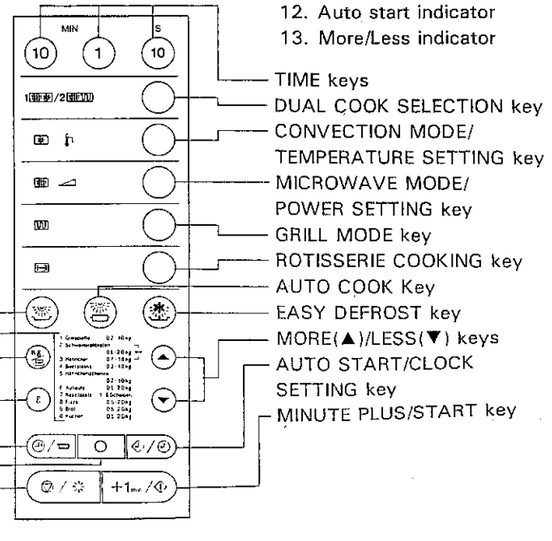
Insert the turntable support into the turntable shaft.
Place turntable on turntable support

Auto-Touch Control Panel



Digital display
Indicators

1. Microwave and defrost indicator
2. Convection indicator
3. Grill indicator
4. Rotisserie indicator
5. Easy reheat indicator
6. Auto cook indicator
7. Easy defrost indicator
8. Cook indicator
9. Weight indicator
10. Microwave power level indicator
11. Number indicator
12. Auto start indicator
13. More/Less indicator


MIN
S
10
1
10
TIME keys
DUAL COOK SELECTION key
CONVECTION MODE/ TEMPERATURE SETTING key
MICROWAVE MODE/ POWER SETTING key
GRILL MODE key
ROTISSERIE COOKING key
AUTO COOK Key
EASY DEFROST key
MORE(▲)/LESS(▼) keys
AUTO START/CLOCK SETTING key
MINUTE PLUS/START key
EASY REHEAT key
AUTO COOK MENU GUIDE in German
You can select and stick the menu label written in your favorite language of Dutch, English, French, Italian and Spanish.
WEIGHT (NUMBER) ENTRY keys
MINUTE TIMER/HOLD key
MAIN POWER OFF key
*Used only in case of an emergency to shut off the power to the oven.
STOP/CLEAR key

SERVICE MANUAL

SHARP

GRILL AND CONVECTION MICROWAVE OVEN

R-10R50(W)/ R-10R50(B)

GENERAL IMPORTANT INFORMATION

This Manual has been prepared to provide Sharp Corp. Service engineers with Operation and Service Information.

It is recommended that service engineers carefully study the entire text of this manual, so they will be qualified to render satisfactory customer service.

(RD36106U)

CAUTION
MICROWAVE RADIATION

Service engineers should not be exposed to the microwave energy which may radiate from the magnetron or other microwave generating devices if it is improperly used or connected. All input and output microwave connections, waveguides, flanges and gaskets must be secured. Never operate the device without a microwave energy absorbing load attached.Never look into an open waveguide or antenna while the device is is energized.

(RD36203U)

WARNING

Never operate the oven until the following points are ensured.
(A) The door is tightly closed.
(B) The door brackets and hinges are not defective.
(C) The door packing is not damaged.
(D) The door is not deformed or warped.
(E) There is not any other visible damage with the oven.

Servicing and repair work must be carried out only by trained service engineers.

All the parts marked "*" on parts list are used at voltages more than 250V.

(RD51110u)

SHARP CORPORATION
OSAKA, JAPAN
(RD37201U)

PRODUCT SPECIFICATIONS
OPERATING SEQUENCE
FUNCTION OF IMPORTANT COMPONENTS
TROUBLESHOOTING CHART
TEST PROCEDURE
TOUCH CONTROL PANEL ASSEMBLY
COMPONENT REPLACEMENT AND ADJUSTMENT PROCEDURE
MICROWAVE MESUREMENT
TEST DATA TABLE AND TEST POINTS ON CONTROL UNIT
WIRING DIAGRAM
PRINTED WIRING BOARD
PARTS LIST

PRODUCT SPECIFICATIONS

ITEM	DESCRIPTION
Power Requirements	220 Volts 50 Hertz Single phase, 3 wire earthed
Power Consumption	Microwave cooking 2.1 kW Approx. 9.5A Dual cooking 1 3.4 kW Approx. 15.5A Dual cooking 2 3.1 kW Approx. 14.1A Convection cooking 1.6 kW Approx. 7.3A Grill cooking Max 2.6kW Approx. 11.8A
Power Output	1000 watts nominal of RF microwave energy (2 liter water load) Operating frequency of 2450MHz
Convection Heating element Power Output	1.5kW
Grill Heating element Power Output	1.0kW (500W x 2)
Outside Dimensions	Width 555 mm Height 390 mm including foot Depth 525 mm
Cooking Cavity Dimensions Turntable diameter	Width 375 mm Height 254 mm Depth 385 mm 365mm
Control Complement	Touch Control System Timer (0 - 99 min. 90 sec.) Microwave Cooking Control Repetition Rate;

Microwave power level indicator	Microwave Power Level
200 400 600 800 1000	1000W (100%)
200 400 600 800	900W (90%)
200 400 600 800	800W (80%)
200 400 600	700W (70%)
200 400 600	600W (60%)
200 400	500W (50%)
200 400	400W (40%)
200	300W (30%)
200	200W (20%)
	100W (10%)

Convection Temperature Control Range;
40 °C, 70 °C, 100 °C, 130 °C, 160 °C, 180 °C, 200 °C, 220 °C, 230 °C, 250 °C
TIME keys, DUAL COOK SELECTION key
CONVECTION MODE/TEMPERATURE SETTING key
MICROWAVE MODE/POWER SETTING key
GRILL MODE key, ROTISSERIE COOKING key
EASY REHEAT key, EASY DEFROST key
WEIGHT (NUMBER) ENTRY keys
MORE(▲)/LESS(▼) keys, MINUTE TIMER/HOLD key
AUTO START/CLOCK SETTING key
AUTO COOK key, STOP/CLEAR key
MINUTE PLUS/START key, MAIN POWER OFF key

Set Weight	Approx. 35.0 kg

OPERATING SEQUENCE

OFF CONDITION

Closing the door activates all door interlock switches (1st latch switch, 2nd Latch switch, 3rd latch switch and stop switch).

IMPORTANT
When the oven door is closed, the monitor switch contacts COM-NC must be open.
When the microwave oven is pluged in a wall outlet (220V 50Hz), 220 volts A.C. is supplied to the point A5+A7 in the control unit.

Figure O-1(a) on page 49 (After plugged in)
1. The display flashes "88:88".
2. To set any programmes or set the clock, you must first touch the STOP CLEAR (⊘/✧) key.
3. 1:00 appears in the display and the time counts up every minute.

NOTE: When the oven door is opened, the oven lamp does not come on at this time. Because the mains relay RY1 contacts are opened.

Figure O-1(b) on page 49 (After cooking)
1. The contacts of mains relay RY1 will be closed when any progames is started.
2. After finished cooking, the contacts of mains relay RY1 are keeping close condition untill the MAIN POWER OFF (○) key is touched

NOTE: When the oven door is opened, the oven lamp comes on at this time.

MICROWAVE COOKING CONDITION

MICROWAVE COOKING AT 500W OUTPUT POWER

Enter a desired cooking time with touching the (10) (1) MIN TIME key and set 500W microwave output power with touch the MICROWAVE MODE/POWER SETTING key six time. And start the oven with touch the MINUTE PLUS/START key.

Function sequency Figure O-2 (a) on page 50

CONNECTED COMPONENTS	RELAY
Magnetron2	-
Inverter unit	-
Step-down transformer	RY10
Turntable motor	RY5, RY4
Oven lamp	RY4
Fan motor 1 and 2	RY2

1. 220 volts A.C. is supplied to the primary winding of the step-down transformer. The voltage is converted to about 120 volts A.C. output on the secondary winding.
2. Inverter unit RF converts 120 volts 50Hz A.C. into high-voltage and high-frequency current and drives the magnetron2 MG2.
3. The magnetron2 MG2 generates the 2450 MHz microwave energy.

VARIABLE OUTPUT POWER COOKING (100W -- 500W)

1. There are present ten (10) microwave power levels. Output power of the magnetron2 MG2 is varied according to variable frequency which is generated output approx. 35 KHz to approx. 70 KHz. from the inverter unit RF.
2. When the 100W power is selected, 500W output of the magnetron2 MG2 present for approx. 2 seconds and the 200W output present the approx. 14 seconds within a 32 seconds time base.

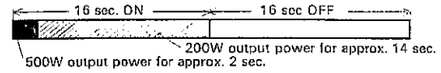


Figure A-1. Operation of magnetron2 MG2 at 100W output

MICROWAVE COOKING AT 1000W OUTPUT POWER

Enter a desired cooking time with touching the TIME key and start the oven with touch the MINUTE PLUS/START key.

Function sequency Figure O-2 (b) on page 50

CONNECTED COMPONENTS	RELAY
Magnetron1	-
Magnetron2	
Inverter unit	-
Power transformer	RY11
Step-down transformer	RY10
Inverter unit	
Turntable motor	RY5, RY4
Oven lamp	RY4
Fan motor 1 and 2	RY2

1. The magnetron2 MG2 present 500W power according to the high-frequency high-voltage from inverter unit.
2. 220 volts A.C. is supplied to the primary winding of the power transformer. The voltage is converted to about 3.3 volts A.C. output on the filament winding and high voltage of approximately 2000 volts A.C. on the secondary winding.
3. The filament winding voltage (3.3 volts) heats the filament of the magnetro1 MG1 and the high voltage (2000 volts) is sent to the voltagedoubling circuit, where it is doubled to negative voltage of approximately 4000 volts D.C..
4. The 2450 MHz microwave energy produced in the magnetron1 MG1 generates 500W output power and a wave length of 12.24 cm.
5. Each 500W output power from magnetronsMG1 and MG2 make 1000W. This energy is channeled through the waveguide (transport channel) into the oven cavity, where the food is placed to be cooked.
6. When the cooking time is up, a signal tone is heard and the relays RY2+RY4+RY5+RY10+RY11 go back to their home position. The circuits to the oven lamp, power transformer, step-dowm transformer, fan motors and turntable motor are cut off. But the contacts of mains relay RY-1 remains closing.
7. When the door is opened during a cook cycle, the switches come to the following condition.

SWITCH	CONTACT	CONDITION DURING COOKING	CONDITION DOOR OPEN (NO COOKING)
1st Latch Switch	COM-NO	Closed	Open
2nd Latch Switch	COM-NO	Closed	Open
Monitor Switch	COM-NC	Open	Closed
3rd Latch Switch	COM-NO	Closed	Open
Stop Switch	COM-NO	Closed	Open

The circuits to the power transformer, step-down transformer, fan motors and turntable motor are cut off when the 1st latch switch, 2nd latch switch, 3rd latch switch and stop switch are made open.
The oven lamp remains on even if the oven door is opened after the cooking cycle has been interrupted, because the relays RY1+RY4 stay closed. Shown in the display is the remaining time.

ONITOR SWITCH CIRCUIT

ıe monitor switch SW4 is mechanically controlled · oven door, and monitors the operation of the 1st :ch switch SW1.
When the oven door is opened during or after the cycle of a cooking program, the 1st, 3rd latch and stop switches SW1+SW3+SW5 must open their contacts first. After that the contacts (COM-NC) of the monitor switch SW4 can be closed and then contacts of the 2nd latch switch SW2 can be opened.
When the oven door is closed, the contacts (COM-NC) of the monitor switch SW4 must be opened first, and the contacts (COM-NO) of the 2nd latch switch SW2 must be closed. After that the contacts of the stop switch SW5, 1st and 3rd latch switches SW1+SW4 are closed.
When the oven door is opened and the contacts of the 1st latch switch SW1 remain closed, the fuse F1 F6.3A will blow, because the monitor switch is closed and a short circuit is caused.

ABLE FOR OUTPUT POWER

: each output power (100W, 200W, ... 900W,)00W), the magnetron1 MG1 and magnetron2 MG2 ɔerate as shown in following table A-1.
ible: A-1

Microwave output power setting	Microwave output power By MG1	By MG2	Total Output
1000 W	500 W	500 W	1000 W
900 W	500 W	400 W	900 W
800 W	500 W	300 W	800 W
700 W	500 W	200 W	700 W
600 W	500 W	100 W	600 W
500 W	OFF	500 W	500 W
400 W	OFF	400 W	400 W
300 W	OFF	300 W	300 W
200 W	OFF	200 W	200 W
100 W	OFF	100 W	100 W

ONVECTION COOKING CONDITION

REHEATING CONDITION (Figure O-3)

'ogram desired convection temperature by touching e CONVECTION MODE key.
'hen the START key is touched, the following operations occur:

1. The coil of shut-off relays RY1, RY2, RY4 and RY5 are energized, the oven lamp, cooling fan motors, turntable motor and convection motor are turned on.
2. The coil of relay RY3 is energized by the control unit. The damper is moved to the closed position, opening the damper switch contacts.
   The opening of the damper switch contacts sends a signal to the LSI on the control unit de-energizing the relay RY3 and opening the circuit to the damper motor.
3. The coil of shut-off relay RY7 is energized by the control unit and the mains supply voltage is added to the convection heating element.
4. When the oven temperature reaches the selected preheat temperature, the following operations occur:
   4-1. The shut-off relay RY7 is de-energized by the control unit temperature circuit and thermistor, opening the circuit to the convection heating element.
   4-2. The oven will continue to function for 15 minutes, turning the convection heating element on and off, as needed to maintain the selected preheat temperature.
   The oven will shut-down completely after 15 minutes.

CONVECTION COOKING CONDITION (Figure O-3)

When the preheat temperature is reached, a beep signal will sound indicating that the holding temperature has been reached in the oven cavity. Open the door and place the food to be cooked in the oven. Program desired cooking time and convection temperature by touching the CONVECTION MODE key.
When the START key is touched, the following operation occur:

1. The nunbers of the digital readout start the count down to zero.
2. The oven lamp, turntable motor, cooling fan motors and convection motor are energized.
3. Relay RY7 is energized (if the cavity temperature is lower than the selected temperature) and the mains supply voltage is applied to the convection heating element to return to the selected cooking temperature.
4. Upon completion of the cooking time, the audible signal will sound, and oven lamp, turntable motor, cooling fan motors and convection motor, are de-energized. At the end of the convection cycle, if the cavity air temperature is above 100 °C, the circuit to RY-2 will be maintained (by the thermistor circuit) to continue operation of the cooling fan motors until the temperature drops below 100 °C, at which time the relay will be de-energized, turning off the fan motors. Relay RY-6 will however, open as soon as the convection cycle has ended, turning off the convection fan motor.
5. At the end of the convection cook cycle, shut-off relay RY-3 is energized turning on the damper motor. The damper is returned to the open position, closing the damper switch contacts which send a signal to the control unit, de-energizing shut-off relay RY-3.

GRILL COOKING CONDITION (Figure O-4(a))

In this condition the food is cooked by grill heating element energy. And at the initial period (approximately 10 minutes) the convection heating element is also activated.
Program desired cooking time and grill mode by touching TIME keys and GRILL MODE key.
When the START key is touched, the following operations occur:

1. The numbers of the digital readout start the count down to zero.
2. The damper motor is turned on to close the damper.
3. The oven lamp, turntable motor, cooling fan motor, and convection motor are energized.
4. The relay (RY8) is energized.
5. The relay (RY7) and (RY6) are energized,. if the cavity temperature is lower than 215 °C. (Refer to Figure O-4(a))
   When the cavity temperature reaches 215 °C. RY7 and RY6 are de-energized. (Refer to Figure O-4(b))
6. Now, the food is grilled by the grill heating element (and convection heating element).
7. If the temperature of oven cavity becomes more than 250 °C, the grill heating element is stopped to be heated. The temperature becomes less than 250 °C, the grill heating element is heated again.
   After cooking, if the cavity air temperature is more than 100 °C, the circuit to RY-2 will be maintained (by thermistor circuit) to continue operation of the cooling fan motors until the temperature drops below 100 °C. If the oven is operated for more than 3 minutes, the fan motors operate for 1 minute even if the cavity air temperature is less than 100 °C.

DUAL COOKING CONDITION

DUAL 1 COOKING (Figure O-5) (Microwave and Convection)

Program desired cooking time and DUAL 1 mode by touching the TIME keys and DUAL COOK SELECTION key.
When the START key is touched, the following operations occur:

1. The numbers of the digital readout start the count down to zero.
2. The damper motor is turned on to close the damper.
3. The oven lamp, turntable motor, cooling fan motors, and convection motor are energized.
4. Relay RY7 is energized (if the cavity temperature is lower than the selected temperature) and the mains supply voltage is supplied to the convection heating element.
5. The relays RY10+RY11 are energized and the microwave energy is generated by the magnetron1 MG1 and magnetron2 MG2
6. Now, the food is cooked by the microwave and convection heating element energy simultaneously.

NOTE: 1000W microwave power can not be set at DUAL COOK1.

DUAL 2 COOKING (Figure O-6) (Microwave and Grill)

Program desired cooking time and DUAL 2 mode by touching the TIME keys and DUAL COOK SELECTION key twice.
When the START key is touched, the following operations occur:

1. The numbers of the digital readout start the count down to zero.
2. The damper motor is turned on to close the damper.
3. The oven lamp, turntable motor and fan motors are energized.
4. Relay RY8 is energized and the mains supply voltage is supplied to the grill heating element.
5. The relays RY10+RY11 are energized and the microwave energy is generated by the magnetron1 MG1 and magnetron2 MG2
6. Now, the food is cooked by the microwave and grill heating element energy simultaneously.
   After cooking, if the cavity air temperature is more than 100 °C, the circuit to RY-2 will be maintained (by thermistor circuit) to continue operation of the cooling fan motors until the temperature drops below 100 °C. If the oven is operated for more than 3 minutes, the fan motors operate for 1 minute even if the cavity air temperature is less than 100 °C.

ROTISSERIE COOKING (Figure O-7)

When the ROTISSERIE COOKING key is touched before touching the START key, the following operations also occur:

1. Relays RY4+RY5 are energized and mains suplly voltage is supllied to the rotisserie motor.
2. The turntable motor does not rotate in Rotisserie Cooking condition.

The Figure O-7 is the Oven Schematic in case that Dual 2 cooking mode is programmed and Rotisserie cooking mode is programmed.

AUTO COOK PROGRAM

Repeat touching the AUTO COOK key until the desired cooking program appears in the display. Then using the WEIGHT ENTRY key, enter the weight (see the chart in the cookbook) and touch the START key. The cooking time, grill mode, dual mode, convection mode, microwave mode and rotisserie cooking mode are automatically computed and selected based on the programs.

EASY DEFROST COOKING

The EASY DEFROST key for automatic defrosting function in 3 defrosting stages. What should be done is enter the weight of food with the weight entry touch WEIGHT ENTRY key. Once the oven starts, it will cook according to the special cooking sequence.

EASY REHEAT COOKING

Repeat touching the EASY REHEAT key until the desired cooking program appears on the display. Then using the WEIGHT ENTRY key, enter the weught or number of food and touch the START key. The cooking time is computed and cooking mode is selected based on the programmes automatically.

FUNCTION OF IMPORTANT COMPONENTS

INVERTER UNIT RF

asic circuit construction

s shown in Figure A-1., the inverter consists of two rcuit:

ne rectifire circuit which rectifies commercial power id supplies non-smooth direct-current voltage, and e single-end resonant type switching circuit where e high-voltage transfomer primary winding and the ower module are connected to the rectifire circuit in ries with the resonant capacitor connected to the ansformer in parallel. Leakage inductance is gener-ed on the secondary side of the high-voltage trans-rmer, output voltage on the secondary side is oosted by the half-wave voltage doubler circuit, and e magnetron is driven. As a control system for the hole circuit, the respective current/ voltage detection rcuit, the synchronizing signal shaping circuit, the ontrol IC and the power module driving circuit com-ise the control circuit.

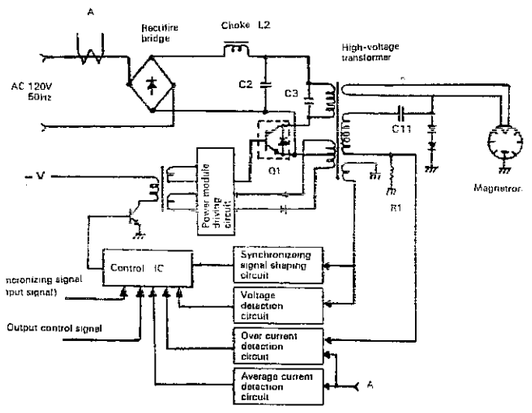


Figure A-1. Basic circuit

asic operation

/hen the power transistor Q1 turns ON, owing to ductance of the high voltage transfomer current flow adually through the primary side of the transformer s shown Figure A-2. (Ic). This allows exciting current id load current to flow through the transformer, and xciting energy to accumulate in the transformer. /hen the Q1 turns OFF after the prescribed current is pplied to the magnetron as a load, the energy accu-ulated in the transformer generates resonance be-veen the resonant capacitor C3 and the primary side f transformer, causing flyback current to flow through ie transformer. At this time, back electromotive force generated in the transformer and flyback voltage is enerated in Q1 as shown in Figure A-2. (Vce). When iis flyback voltage is reduced by resonance, Q1 is rned ON again, so that switching loss can be re-uced. Circuit operation described above repeats ontinuously. By this switching, high-frequency igh-voltage 35 -- 70 kHz indicated on the secondary de of the high-voltage transformer, and further oosted by the half-wave voltage doubler circuit, is finally applied to the magnetron. While Q1 is OFF, i.e. flyback condition, charge is stored in the high-voltage capacitor C11.While Q1 is ON, boosted power voltage is applied to C11, resulting in current flow to magnetron. Because of the narrow operating range of the magnetron and the low limit of the peak current, flyback voltage is restricted to less than a certain level so that charging voltage of C11 can be controlled to obtain good control of the peak current. Furthermore the average current detection circuit controls the upper limit of the pluse width to regulate total power. That is, since the magnetron cannot oscillate unless the voltage reaches the prescribed level, controlling the upper limit of the pulse width changes the source voltage supplying the flyback voltage required to os-cillate the magnetron. Consquently, the oscillating range of the magnetron changs in connection with the commercial power frequency, and thus total power can be regulated.

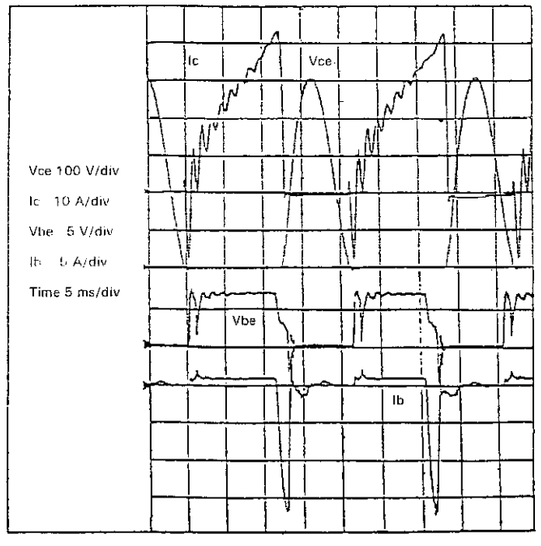


Figure D-2. Powermodule switching waveforms.

Overvoltage/ overcurrent protection circuit

The moment that the surge voltage/ current caused by an anomalous condition such as moding in the magnetron is detected, the inverter stops oscillating to protect the power module, and approx. 1 ms later the inverter softly starts.

MAGNETRON 2 MG2

This magnetron 2 MG2 must be driven by only inverter unit RF and generates the 2450 MHz microwave energy.

STEP-DOWN TRANSFORMER T2

This step-down transformer T2 converts the 220 volts A.C. into the 120 volts A.C. energy.

DOOR OPEN MECHANISM

The door can be opened by pushing the open button on the control panel. When the open button is pushed, the open lever pushes latch lever. The latch lever pushes lower latch head on the door upward. The upper latch head is linked with the lower latch lead, so now, the door can be opened.

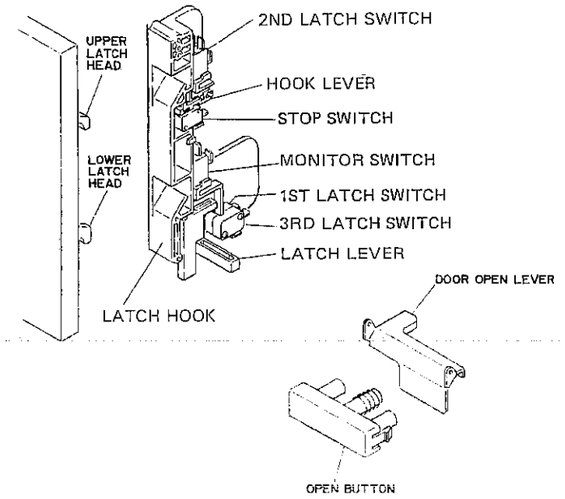


Figure D-3. Door Open Mechanism

1ST, 2ND, 3RD LATCH SWITCHES AND STOP SWITCH SW1, SW2, SW3, SW5

1. When the oven door is closed, the contacts COM-NO must be closed.
2. When the oven door is opened, the contacts COM-NO must be opened.

MONITOR SWITCH SW4

The monitor switch is activated (the contacts opened) by the lower latch head on the door while the door is closed. The switch is intended to render the oven inoperative by means of blowing the fuse(F6.3A) F1 when the contacts of the 1st latch switch SW1 fail to open when the door is opened.

Function

1. When the door is opened, the monitor switch SW4 contacts close (to the ON condition) due to their being normally closed. At this time the 1st latch switch SW1 is in the OFF condition (contacts open) due to their being normally open contact switches.
2. As the door goes to a closed position, the monitor switch contacts are first opened and 1st latch switch contacts are closed. (On opening the door, each of these switches operate inversely.)
3. If the door is opened and the 1st latch switch contacts fail to open, the fuse F1 (F6.3A) blows simultaneously with closing of the monitor switch contacts.

CAUTION: BEFORE REPLACING A BLOWN FUSE F1 F6.3A TEST THE 1ST LATCH SWITCH, MONITOR SWITCH AND MONITOR RESISTOR FOR PROPER OPERATION.
(REFER TO CHAPTER "TEST PROCEDURE").

MONITOR RESISTOR R1 3.6 Ω/10W

The monitor resistor prevents the fuse F6.3A 250V bursting when the fuse F1 F6.3A 250V blows due to the operation of the monitor switch.

NOISE FILTER

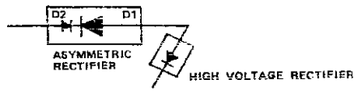
The noise filter assembly prevents radio frequency interference that might flow back in the power circuit.

20A SPECIAL FUSE F

If the wire harness or electrical components are short-circuited, this special fuse F blows to prevent an electric shock or fire hazzard.

ASYMMETRIC RECTIFIER

The asymmetric rectifier is solid state device that prevents current flow is both directions. And it prevents the temperature rise of the power transformer by blowing the fuse F1 F6.3A when the high voltage rectifier is shorted.



The rated peak reverse voltage of D1 of the asymmetric rectifier is 6 KV The rated peak reverse voltage of D2 of the asymmetric rectifier is 1.5 KV. D1 and D2 of the asymmetric rectifier or high voltage rectifier are shorted when the each peak reverse voltage goes beyond the each rated peak reverse voltage. (The process of the blowing the fuse F2 F6.3A.)

1. The high voltage rectifier is shorted by any causes when microwave cooking or dual cooking.
2. The peak reverse voltage of D2 of the rectifier goes beyond the rated peak reverse voltage 1.5 kV in the voltage doubler circuit.
3. D2 of the rectifier is shorted.
4. The large electric currents flow through the high voltage winding of the power transformer.
5. The large electric currents beyond F6.3A flow through the primary widing of the power transformer.
6. The fuse F2 F6.3A blows by the large electric currents.
7. The power supplying to the power transformer is disconnected.

FUSE F1 F6.3A 250V

1. If the wire harness or electrical components are short-circuited, this fuse blows to prevent an electric shock or fire hazzard.
2. The fuse also blows when 1st latch switch SW1 remains closed with the oven door open and when the monitor switch SW4 closes.

USE F2 F6.3A 250A

If the wire harness or electrical components are short-circuited, this fuse blows to prevent an electric shock or fire hazzard.
The fuse blows when the asymmetric rectifier, H.V. rectifier, H.V. wire harness, H.V. capacitor, magnetron or secondary winding of power transformer is shorted.

USE F3 F6.3A 250A

the wire harness or Step-down transformer is ıort-circuited, this fuse blows to prevent an electric ıock or fire hazzard.

EMPERATURE FUSES TF1 AND TF2 150 ›

ıis fuse protects the magnetron against overheat. If e temperature goes up higher than 150 °C because e fan motor is interrupted, the air inlet duct is blocked the ventilation openings are obstructed, the fuse ows and puts the oven out of operation. The defec-ve fuse must be replaced with new rated one.

HERMAL CUT-OUT TC1 115 °C (RF)

ıe thermal cut out protects the inverter unit RF jainst overheat. If the temperature of the inverter unit F rises above 115 °C because the fan motor 2 FM2 interrupted, the ventilation openings are obstructed the other abnormal matter occurs, the thermal ıt-out opens and switches off the oven. The defec-ve thermal cut-out must be replaced with new rated ıe.

HERMAL CUT-OUT TC2 145 °C (CONV.)

ıe thermal cut out protects the convection motor CM jainst overheat. If the temperature of the convection otor CM rises above 145 °C because the convection n is interrupted, the ventilation openings are ob-ructed or the other abnormal matter occurs, the ther-al cut-out opens and switches off the oven. The efective thermal cut-out must be replaced with new ted one.

HERMAL CUT-OUT TC3 150 °C

ıe thermal cut out protects the oven against overheat uring grill cooking, convection cooking or dual combination) cooking. If the temperature rises above 50 °C because the fan motor is interrupted, the air ılet duct is blocked or the ventilation openings are bstructed, the thermal cut-out opens and switches ff the grill heating elements GH+GH and convection eating element CH.When the oven cools itself down › the operating temperature of 120 °C. The contacts f the thermal cut-out will close again and the grill eating elements GH+GH and convection heating ement CH will be in function again.

HERMISTOR

he thermistor is a negative temperature coefficient ›pe. The temperature in the oven cavity is detected ırough the resistance of the thermistor, and then the ontrol unit causes the heater relay to operate, thus the ırrent to the heating element is turned ON/OFF.

SURGE RELAY RY9 AND SURGE RESISTOR R2 10 Ω/20W

When the START [+1-/⏲] key is touched the contacts of the surge relay RY9 close and the surge current flows through the surge resistor R2 for 200 msec. After about 15 msec. since the START [+1-/⏲] key is touched, the relay(s) RY10 and/orRY11 close and supplies the step-down transformer and/or power transformer with 220V. After 200 msec. The surge relay RY9 opens its contacts and gets out of function. The surge resistor R2 lets the current (peak current) flow when the oven is switched on. If surge resistor is defective, the home fuse or the fuse F2 or F3 may break down when the oven is switched on (Micowave mode/ Dual mode).

CAUTION; THE SURGE RELAY RY9 CLOSES FOR ONLY 200 msec. JUST WHEN THE OVEN GETS RESTARTED, BUT OPENS AGAIN. WITHIN THIS 200 msec., THE RELAY(S) RY10 AND/OR RY11 MUST CLOSE.

MAINS RELAY RY1

1. When once the START [+1-/⏲] key is touched, the contacts of the mains relay RY1 are kept closed.
2. If the MAIN POWER OFF [○] key is touched, the contacts of the mains relay RY1 are opened , and all electrical components except the control unit and noise filter turned off.
3. When the START [+1-/⏲] key is touched again, the contacts of the mains relay RY1 are closed again.

CAUTION; THE MAIN POWER OFF [○] KEY SHOULD BE USED ONLY IN CASE OF AN EMARGENCY TO SHUT OFF THE POWER TO THE OVEN.
If the MAIN POWER OFF [○] KEY IS USED IN CASE OF NORMALY OPERATION, THE CONVECTION FAN, CONVECTION FAN DUCT, CONVECTION FAN MOTOR OR ANY OTHER PARTS MAY BE DAMAGED.

TURNTABLE MOTOR TTM

The turntable motor drives the turntable supporting plate to rotate the turntable.

CONVECTION MOTOR CM

The convection motor drives the convection fan and provids the heated air.

FAN MOTOR FM1

The fan motor drives a blade which draws external cool air. This cool air cools the power transformer, step-down transformer, inverter unit etc..

FAN MOTOR FM2

The fan motor drives a blade which draws external cool air. This cool air is directed through the air vanes surrounding the magnetron and cools the magnetron. This air is channeled through the oven cavity to remove steam and vapors given off from the heating foods. It is then exhausted through the exhausing air vents at the oven cavity.

GRILL HEATING ELEMENTS GH1 AND GH2

The grill heating elements are provided to brown the food and are located on the top of the oven cavity.

CONVECTION HEATING ELEMENT

The convection heating element is located at the rear of the oven cavity. It is intended to heat air driven by the convection fan. The heated air is kept in the oven and force-circulated and reheated by the convection heating element.

CONVECTION COOKING SYSTEM

This oven is designed with a hot air heating system where food is not directly heated up by the convection heating element, but is instead heated by forced circulation of the hot air produced by the convection heating element.
The air heated by the convection heating element is circulated through the convection passage provided on the outer casing of the oven cavity means of the convection fan which is driven by the convection motor. It then enters the inside of the oven through the vent holes provided on the back side of the oven. Next,the hot air heats the food on the turntable and leaves the oven cavity through the vent in the oven cavity rear wall.
Without leaving the oven, this hot air is reheated by the convection heating element, passes through the convection passage and enters the inside of the oven cavity again, in a continuing cycle.
In this way, the hot air circulates inside the oven cavity to raise its temperature and, at the same time, comes into contact with the food being cooked.
When the temperature inside the oven cavity reaches the selected temperature, the convection heating element is de-energized. When the temperature inside the oven cavity drops below the selected temperature, the convection heating element is energized again. In this way, the inside of the oven cavity is maintained at approximately the selected temperature.
When the convection time reaches "0", the convection heating element is deenergized and the convection fan stops operating and the oven shuts off.
At the high temperature(more then 100 °C), the fan motors remains rotating. Automatically the fan motors will be shut down at low temperature(less than 100 °C).

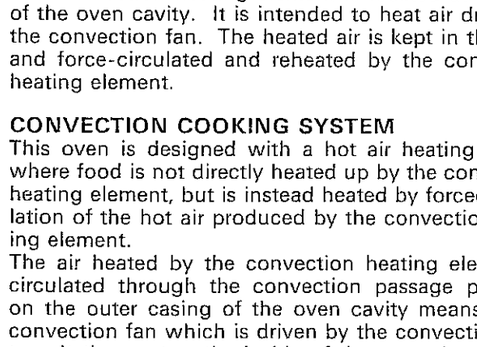


Figure D-4 Convection Cooking System

DAMPER OPEN-CLOSE MECHANISM

Usually, the damper is in the open position except during convection cooking, grill cooking, dual cooking. Damper position is set automatically by damper motor, damper switch, damper cam and damper shaft.
These components are operated by a signal that judges if microwave cooking, convection cooking, grill cooking or dual cooking operation is selected by the control unit.
Microwave Cooking:
Damper is in the open position, because a portion of cooling air is channeled through the cavity to remove steam and vapors given off from the heating foods.
It is then exhausted at the top of the oven cavity into a condensation compartment.

Convection Cooking:
Damper is in the closed position, so that no hot air will be allowed to leak out the oven cavity.

Damper Operation

1. When power supply cord is plugged in:
   1-1. When power supply cord is plugged in and any cooking programs are started, a signal is sensed in the control unit, and operates shut-off relay (RY3).
   1-2. Contacts of shut-off relay (RY3) close, the damper motor is energized, opening the damper door.
   1-3. When the damper is moved to the open position by the damper cam, damper switch is closed (ON position).
   1-4. The signal of damper switch is re-sensed in the control unit and shut-off relay (RY3) is turned off.
   1-5. The 220 volts A.C. to the damper motor is stopped and the motor turns off.

2. When oven is microwave cooking:
   Damper is in the open position.

3. When oven is convection cooking:
   3-1. Damper motor is energized by touching the CONVECTION MODE [♨] key and MINUTE PLUS/START [+1-/⏲] key.
   3-2. When damper is in the closed position (damper switch is OFF), its signal is sensed by the control unit, and shut-off relay (RY3) is de-energized.
   3-3. The damper is held in the closed position during the convection cooking operation.
   3-4. At the end of the convection cooking, shut-off relay (RY3) is energized, and the damper is returned to the open position.

4. Whe oven is grill or dual cooking:
   4-1. The damper mechanizm operates same as above 3.

NOTE: If the damper is not in the proper position, closed during convection, grill and dual cooking or opened during microwave, the control unit will stop oven operation after 1 minute.

OPERATION OF FAN MOTORS FM1+FM2 CONTROLLED BY THERMISTOR AND CONTROL UNIT

1. After convection, grill or dual cooking, if the temperature of the thermistor is more than 100 °C, the circuit to relay RY2 will be maintained (by the thermistor circuit) to continue operation of the fan motors FM1+FM2 until the temperature drops below 100 °C, at which time the relay RY2 will be de-energized, turning off the fan motors FM1+FM2.
2. the fan motors FM1+FM2, rotate for 1 minute after the oven is operated for more than 3 minutes in convection, grill or dual cooking mode.

OPEN JUDGE BY THERMISTOR

1. If the temperature of the thermistor does not rise to more than 40 °C after 10 minutes from when the oven is started in convection, grill or dual cooking mode, the oven is turned off.
2. When the thermistor or the wire harness to the thermistor is opened, the oven is turned off because this condition is same as above 1 ,*

ROTISSERIE COOKING SYSTEM

All the surfaces of the food will be able to be cooked without turning over by rotating the food which the skewer is inserted into.

ROTTISSERIE MOTOR

The rotisserie motor is located on the on the right side wall of the oven cavity
The skewer is rotated by the rotisserie motor assembly.

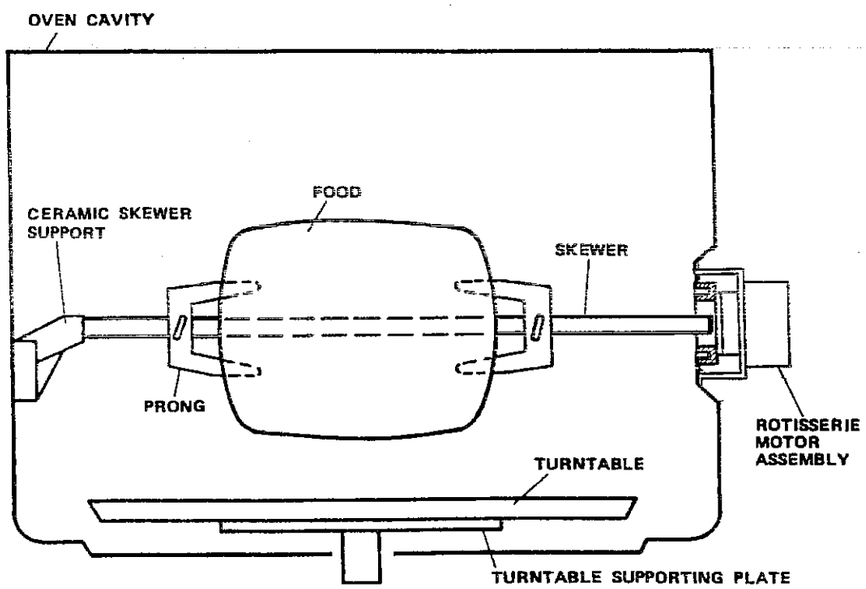


Figure D-5. Rottisserie Mechanism

SERVICING

WARNING TO SERVICE PERSONNEL

Microwave ovens contain circuitry capable of producing very high voltage and current, contact with any part of the high voltage circuit will result in electrocution.

REMEMBER TO CHECK 3D

1) Disconnect the supply.
2) Door opened, and wedged open.
3) Discharge high voltage capacitor.

WARNING AGAINST THE CHARGE OF THE HIGH-VOLTAGE CAPACITOR

The high-voltage capacitor remains charged about 60 seconds after the oven has been switched off. Wait for 60 seconds and then short-circuit the connection of the high-voltage capacitor (that is, of the connecting lead of the high-voltage rectifier) against the chassis with the use of an insulated screwdriver.

Sharp recommend that wherever possible fault-finding is carried out with the supply disconnected. It may in, some cases, be necessary to connect the supply after the outer case has been removed, in this event carry out 3D checks and then disconnect the leads to the primary of the power transformer and TAB 1 and TAB 2 of Inverter Unit. Ensure that these leads remain isolated from other components and the oven chassis. (Use insulation tape if necessary.) When the testing is completed carry out 3D checks and reconnect the leads to the primary of the power transformer.

REMEMBER TO CHECK 4R

1) Reconnect all leads removed from components during testing.
2) Replace the outer case (cabinet).
3) Reconnect the supply.
4) Run the oven. Check all functions.

Microwave ovens should not be run empty. To test for the presence of microwave energy within a cavity, place a cup of cold water on the oven turntable, close the door and set the microwave timer for two (2) minutes. Set the power level to HIGH and push the START button. When the two minutes has elapsed (timer at zero) carefully check that the water is now hot. If the water remains cold carry out 3D checks and re-examine the connections to the component being tested.

When all service work is completed, and the oven is fully assembled, the microwave power output should be checked and a microwave leakage test carried out.

TROUBLESHOOTING GUIDE

When troubleshooting the microwave oven, it is helpfull to follow the Sequence of Operation in performing the checks. Many of the possible causes of trouble will require that a specific test be performed. These tests are given a procedure letter which will be found in the "Test Procedure"section.

IMPORTANT: If the oven becomes inoperative because of a blown fuse F1 (F6.3A) in the 1st latch switch - monitor switch - monitor resisitor circuit, check the 1st latch switch, monitor switch and monitor resistor before replacing the fuse F1 (F6.3A).

| CONDITION | TEST PROCEDURE / POSSIBLE CAUSE AND DEFECTIVE PARTS / PROBLEM | MAGNETRON MG1 A1 | POWER TRANSFORMER B | H.V. RECTIFIER | HIGH VOLTAGE RECTIFIER ASSEMBLY C | ASYMMETRIC RECTIFIER | H.V. HARNESS | HIGH VOLTAGE CAPACITOR D | 1ST LATCH SWITCH E | 2ND LATCH SWITCH E | 3RD LATCH SWITCH E | STOP SWITCH E | MONITOR SWITCH E | DAMPER SWITCH E | 20A SPECIAL FUSE F | FUSE F1 F6.3A G1 | FUSE F2 F6.3A G2 | FUSE F3 F6.3A G3 | MAGNETRON MG2 A2 | INVERTER UNIT RF H | STEP-DOWN TRANSFORMER I | MONITOR RESISTOR R1 J | SURGE RESISTOR R2 J | NOISE FILTER K | TEMP. FUSE 150°C TF1 L | TEMP. FUSE 150°C TF2 L | THERMAL CUT-OUT 115°C TC1 L | THERMAL CUT-OUT 145°C TC2 L | THERMAL CUT-OUT 150°C TC3 L | ROTISSERIE MOTOR RM M | CONV. FAN MOTOR CM M | DAMPER MOTOR DM M | TURNTABLE MOTOR TTM M | FAN MOTOR FM1 M | FAN MOTOR FM2 M | GRILL HEATING ELEMENT GH1 O | GRILL HEATING ELEMENT GH2 O | CONV. HEATING ELEMENT CH O | THERMISTOR P | POWER SUPPLY CORD | RELAY UNIT | SHORTED WIRE HARNESS | OPENED WIRE HARNESS | OVEN LAMP | OVEN LAMP SOCKET | WALL OUTLET | Damper is not in proper position. | BLOCKED VENTILATION OPENINGS | WRONG OPERATION | MIS-ADJUSTMENTS OF SWITCHES | HOME FUSE or BREAKER | NO POWER AT WALL OUTLET | BLOCKED CONVECTION FAN | BLOCKED COOLING FAN | TOUCH CONTROL PANEL Q | RELAY ON CONTROL UNIT R | FOIL PATTERN S | MAINS RELAY RY1 T | SURGE RELAY RY9 U | RELAY RY10 U |
|---|---|---

| CODE-NO. | PROBLEM / POSSIBLE CAUSE AND DEFECTIVE PARTS / TEST PROCEDURE | MAGNETRON MG1 A1 | POWER TRANSFORMER B | H.V. RECTIFIER / ASYMMETRIC RECTIFIER / HIGH VOLTAGE RECTIFIER ASSEMBLY C | H.V. HARNESS | HIGH VOLTAGE CAPACITOR D | 1ST LATCH SWITCH E | 2ND LATCH SWITCH E | 3RD LATCH SWITCH E | STOP SWITCH E | MONITOR SWITCH E | DAMPER SWITCH E | 20A SPECIAL FUSE F | FUSE F1 F6.3A G1 | FUSE F2 F6.3A G2 | FUSE F3 F6.3A G3 | MAGNETRON MG2 A2 | INVERTER UNIT RF H | STEP-DOWN TRANSFORMER I | MONITOR RESISTOR R1 J | SURGE RESISTOR R2 J | NOISE FILTER K | TEMP. FUSE 150°C TF1 L | TEMP. FUSE 150°C TF2 L | THERMAL CUT-OUT 115°C TC1 L | THERMAL CUT-OUT 145°C TC2 L | THERMAL CUT-OUT 150°C TC3 L | ROTISSERIE MOTOR RM M | CONV. FAN MOTOR CM M | DAMPER MOTOR DM M | TURNTABLE MOTOR TTM M | FAN MOTOR FM1 M | FAN MOTOR FM2 M | GRILL HEATING ELEMENT GH1 O | GRILL HEATING ELEMENT GH2 O | CONV. HEATING ELEMENT CH O | THERMISTOR P | POWER SUPPLY CORD | RELAY UNIT | SHORTED WIRE HARNESS | OPENED WIRE HARNESS | OVEN LAMP | OVEN LAMP SOCKET | WALL OUTLET | Damper is not in proper position. | BLOCKED VENTILATION OPENINGS | WRONG OPERATION | MIS-ADJUSTMENTS OF SWITCHES | HOME FUSE or BREAKER | NO POWER AT WALL OUTLET | BLOCKED CONVECTION FAN | BLOCKED COOLING FAN | TOUCH CONTROL PANEL Q | RELAY ON CONTROL UNIT R | FOIL PATTERN S | MAINS RELAY RY1 T | SURGE RELAY RY9 U | RELAY RY10 U |
|---|---|---

CONDITION	PROBLEM / POSSIBLE CAUSE AND DEFECTIVE PARTS / TEST PROCEDURE	MAGNETRON MG1 A1	POWER TRANSFORMER B	H.V. RECTIFIER / ASYMMETRIC RECTIFIER / HIGH VOLTAGE RECTIFIER ASSEMBLY C	H.V. HARNESS	HIGH VOLTAGE CAPACITOR D	1ST LATCH SWITCH E	2ND LATCH SWITCH E	3RD LATCH SWITCH E	STOP SWITCH E	MONITOR SWITCH E	DAMPER SWITCH E	20A SPECIAL FUSE F	FUSE F1 F6.3A G1	FUSE F2 F6.3A G2	FUSE F3 F6.3A G3	MAGNETRON MG2 A2	INVERTER UNIT RF H	STEP-DOWN TRANSFORMER I	MONITOR RESISTOR R1 J	SURGE RESISTOR R2 J
	Oven does not seem to be operating properly when 600W, 700W, 800W or 900W is set. (The oven operates properly at 1000W.)																	○			
	Oven goes into cook cycle but shuts down before end of cycle.												○	○							
CONVECTION COOKING CONDITION	Convection heating element does not operate.						○														
	Oven seems to be operating but temperature in the oven cavity is lower or higher than preset one.																				
GRILL COOKING CONDITION	Grill heating element does not operate.						○														
	Though the temperature of the oven cavity is higher than 215°C convection heating element does not stop to heat. Or though the temperature of oven cavity is lower than 215°C convection heating element does not stop to heat.																				
DUAL 1, 2 COOKING CONDITION	Oven goes into cooking cycle but shuts down before end of cooking cycle.												○								
	Oven seems to be operating but little or no heat is produced in oven load. (Microwave power does not seem to be generated properly.)	○	○	○	○	○	○		○	○				○		○	○	○	○		
DUAL 1 COOKING CONDITION	Oven seems to be operating but the temperature of the oven cavity is lower or higher than preset one.																				
	Convection heating element does not operate.																				
DUAL 2 COOKING CONDITION	Grill heating element does not operate.																				

PROBLEM / POSSIBLE CAUSE AND DEFECTIVE PARTS / TEST PROCEDURE	NOISE FILTER K	TEMP. FUSE 150°C TF1 L	TEMP. FUSE 150°C TF2 L	THERMAL CUT-OUT 115°C TC1 L	THERMAL CUT-OUT 145°C TC2 L	THERMAL CUT-OUT 150°C TC3 L	ROTISSERIE MOTOR RM M	CONV. FAN MOTOR CM M	DAMPER MOTOR DM M	TURNTABLE MOTOR TTM M	FAN MOTOR FM1 M	FAN MOTOR FM2 M	GRILL HEATING ELEMENT GH1 O	GRILL HEATING ELEMENT GH2 O	CONV. HEATING ELEMENT CH O	THERMISTOR P	POWER SUPPLY CORD	RELAY UNIT	SHORTED WIRE HARNESS	OPENED WIRE HARNESS	OVEN LAMP	OVEN LAMP SOCKET	WALL OUTLET	Damper is not in proper position.	BLOCKED VENTILATION OPENINGS	WRONG OPERATION	MIS-ADJUSTMENTS OF SWITCHES	HOME FUSE or BREAKER	NO POWER AT WALL OUTLET	BLOCKED CONVECTION FAN	BLOCKED COOLING FAN	TOUCH CONTROL PANEL Q	RELAY ON CONTROL UNIT R	FOIL PATTERN S	MAINS RELAY RY1 T	SURGE RELAY RY9 U	RELAY RY10 U
Oven does not seem to be operating properly when 600W, 700W, 800W or 900W is set. (The oven operates properly at 1000W.)		○																													○				
Oven goes into cook cycle but shuts down before end of cycle.			○	○																											○				
Convection heating element does not operate.						○									○	○			○														○			
Oven seems to be operating but temperature in the oven cavity is lower or higher than preset one.								○							○	○							○							○	○				
Grill heating element does not operate.						○							○	○		○			○														○			
Though the temperature of the oven cavity is higher than 215°C convection heating element does not stop to heat. Or though the temperature of oven cavity is lower than 215°C convection heating element does not stop to heat.																○				○												○	○			
Oven goes into cooking cycle but shuts down before end of cooking cycle.	○	○	○	○																											○				
Oven seems to be operating but little or no heat is produced in oven load. (Microwave power does not seem to be generated properly.)																			○	○			○								○	○			
Oven seems to be operating but the temperature of the oven cavity is lower or higher than preset one.					○		○								○	○				○										○	○	○			
Convection heating element does not operate.					○		○								○					○												○			
Grill heating element does not operate.													○	○						○												○			

TEST PROCEDURES

PROCEDURE LETTER	COMPONENT TEST
A1	MAGNETRON TEST

NEVER TOUCH ANY PART IN THE CIRCUIT WITH YOUR HAND OR AN INSULATED TOOL WHILE THE OVEN IS IN OPERATION.

CARRY OUT3DCHECKS

Isolate the magnetron from the high voltage circuit by removing all leads connected to the filament terminal.

To test for an open circuite filament use an ohmmeter to make a continuity test between the magnetron filament terminals, the meter should show a reading of less than 1 ohm.

To test for a short circuit filament to anode condition, connect ohmmeter between one of the filament terminals and the case of the magnetron (ground). This test should be indicated an inifinite resistance. If a low or zero resistance reading is obtained then the magnetron should be replaced.

MICROWAVE OUTPUT POWER
The following test procedure should be carried out with the microwave oven in a fully assembled condition (outer casefitted).
Microwave output power from the magnetron can be measured by way of substitution, i.e. it can be measured by using water load how much it can be absorbed by the water load. To measure the microwave output power in the microwave oven, the relation of calorie and watt is used.
When P(W) heating works for t(second), approximately P x t/4.2 calorie is generated. On the other hand, if the temperature of the water with V(ml) rises $\triangle T$ (°C) during this microwave heating period, the calorie of the water is V x $\triangle T$.

The formular is as follows,

$$P \times t / 4.2 = V \times \triangle T$$
$$P\ (W) = 4.2 \times V \times \triangle T / t$$

Our condition for the water load is as follows:
Room temperature ... around 20 °C, Power supply Voltage ... 220 volts.
Water load ... 2000 ml, Initial temperature ... 10 ±1 °C, Heating time ...1min. 24sec
$P = 100 \times \triangle T$

Measuring method:
A) The two water containers must be prepared.
The water container must be one (1) litre beaker made of Pyrex glass and its diameter approximately 12cm.
B) Put the one (1) litre water into each beaker (Each beaker has one litre water). The initial temperature of the water should be 10 ±1 °C.
C) Mark T1 on the one beaker and mark T2 on the other one. And stir the water and measure the temperature of water the thermometer and note them. The graduation of the thermometer must be scaled by 0.1 °C at minimum and an accurate mercury thermometer is recommended.

Example: The initial temperature T1 = 10 °C, T2 = 11 °C

D) Place the two (2) beakers at right and left, side by side, on the center of the oven cavity.
E) Set the timer to three (3) minutes and start the oven at 1000W.
F) The time must be measured with stopwatch or wristwatch.
G) After 1 minute and 24 seconds, stop the oven by opening the door.
H) Put the two (2) beakers out of the oven cacity and measure the temperature of the water by stiring the water with thermometer and note them.

TEST PROCEDURES (CONT'D)

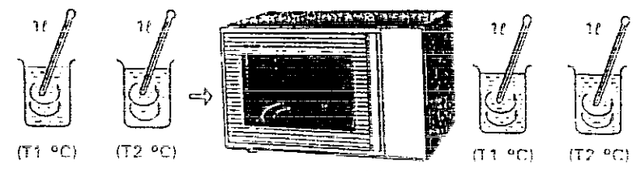
PROCEDURE LETTER	COMPONENT TEST

Example: T1 = 20 °C, T2 = 21 °C

Initial temperature	T1 = 10 °C T2 = 11 °C
Temperature after 1 min. 52 sec.	T1 = 20 °C T2 = 21 °C
Temperature difference Cold-Warm	$\triangle T1$ = 10 °C $\triangle T2$ = 10 °C
Mean temperature rise $\triangle T$	$\triangle T = (\triangle T1 + \triangle T2) / 2$ = (10 °C + 10 °C) / 2 = 10 °C
Measured output power The equation is as follows: $P = 100 \times \triangle T$	P= 100 x 10 °C = 1000 Watts

NOTE: The measured output power should be at least ±15 % of the rated output power.

CAUTION: 1 °C CORRESPONDS TO 100 WATTS.
REPEAT MEASUREMENT IF THE POWER IS INSUFFICIENT.



A2	MAGNETRON TEST

NEVER TOUCH ANY PART IN THE CIRCUIT WITH YOUR HAND OR AN INSULATED TOOL WHILE THE OVEN IS IN OPERATION.

CARRY OUT3DCHECKS

Isolate the magnetron from the high voltage circuit by removing all leads connected to the filament terminal.

To test for an open circuite filament use an ohmmeter to make a continuity test between the magnetron filament terminals, the meter should show a reading of less than 1 ohm.

To test for a short circuit filament to anode condition, connect ohmmeter between one of the filament terminals and the case of the magnetron (ground). This test should be indicated an inifinite resistance. If a low or zero resistance reading is obtained then the magnetron should be replaced.

MICROWAVE OUTPUT POWER
The following test procedure should be carried out with the microwave oven in a fully assembled condition (outer casefitted).
Microwave output power from the magnetron can be measured by way of substitution, i.e. it can be measured by using water load how much it can be absorbed by the water load. To measure the microwave output power in the microwave oven, the relation of calorie and watt is used.
When P(W) heating works for t(second), approximately P x t/4.2 calorie is generated. On the other hand, if the temperature of the water with V(ml) rises $\triangle T$ (°C) during this microwave heating period, the calorie of the water is V x $\triangle T$.

TEST PROCEDURES (CONT'D)

PROCEDURE LETTER	COMPONENT TEST

The formular is as follows;

$P \times t / 4.2 = V \times \Delta T$
$P\ (W) = 4.2 \times V \times \Delta T / t$

Our condition for the water load is as follows:
Room temperature ... around 20 °C, Power supply Voltage ... 220 volts.
Water load ... 2000 ml, Initial temperature ... 10 ±1 °C, Heating time ...2min. 48sec
$P = 50 \times \Delta T$

Measuring method:

A) The two water containers must be prepared.
The water container must be one (1) litre beaker made of Pyrex glass and its diameter approximately 12cm.

B) Put the one (1) litre water into each beaker (Each beaker has one litre water). The initial temperature of the water should be 10 ±1 °C.

C) Mark T1 on the one beaker and mark T2 on the other one. And stir the water and measure the temperature of water the thermometer and note them. The graduation of the thermometer must be scaled by 0.1 °C at minimum and an accurate mercury thermometer is recommended.

Example: The initial temperature T1 = 10 °C, T2 = 11 °C

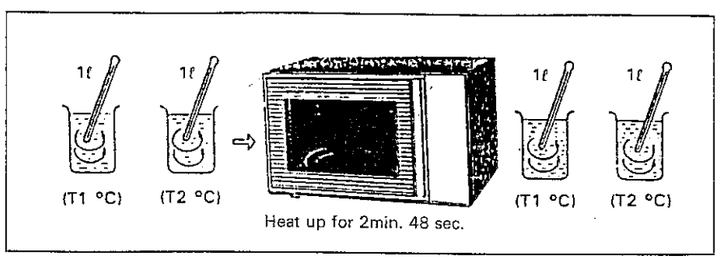
D) Place the two (2) beakers at right and left, side by side, on the center of the oven cavity.
E) Set the timer to three (3) minutes and start the oven at 500W.
F) The time must be measured with stopwatch or wristwatch.
G) After 2 minute and 48 seconds, stop the oven by opening the door.
H) Put the two (2) beakers out of the oven cacity and measure the temperature of the water by stiring the watet with thermometer and note them.

Example T1 = 20 °C, T2 = 21 °C

Initial temperature	T1 = 10 °C T2 = 11 °C
Temperature after 1 min. 52 sec.	T1 = 20 °C T2 = 21 °C
Temperature difference Cold-Warm	ΔT1 = 10 °C ΔT2 = 10 °C
Mean temperature rise ΔT	ΔT = (ΔT1 + ΔT2) / 2 = (10 °C + 10 °C) / 2 = 10 °C
Measured output power The equation is as follows: P= 50 x ΔT	P= 50 x 10 °C = 500 Watts

NOTE: The measured output power should be at least ±15 % of the rated output power.

CAUTION: 1 °C CORRESPONDS TO 50 WATTS.
REPEAT MEASUREMENT IF THE POWER IS INSUFFICIENT.



TEST PROCEDURES (CONT'D)

PROCEDURE LETTER	COMPONENT TEST

B **POWER TRANSFORMER TEST**

WARNING: High voltages and large currents are present at the secondary winding and filament winding of the power transformer. It is very dangerous to work near this part when the oven is on. NEVER make any voltage measurements at the high-vltage circuits, including the magnetron filament.

CARRY OUT 3D CHECKS.

Disconnect the leads to the primary winding of the power transformer. Disconnect the filament and secondary winding connections from the rest of the HV circuitry. Using an ohmmeter, set on a low range, it is possible to check the continuity of all three windings. The following readings should be obtained :-

a. Primary winding ----------2.09 ohms approximately.
b. Secondary winding --------110 ohms approximately.
c. Filament winding ---------less than 1 ohm.

If the reading obtained are not as stated above, then the power transformer is probably faulty and should be replaced.

CARRY OUT 4R CHECKS

C **HIGH VOLTAGE RECTIFIER ASSEMBLY TEST**

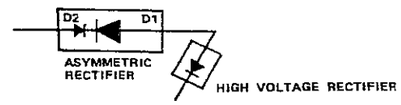
HIGH VOLTAGE RECTIFIER TEST

CARRY OUT 3D CHECKS.

Isolate the high voltage rectifier assembly from the HV circuit. The high voltage rectifier can be tested using an ohmmeter set to its highest range. Connect the ohmmeter across the terminal B+C of the high voltage rectifier and note the reading obtained. Reverse the meter leads and note this second reading. The normal resistance is intinte in one direction and mor than 100 k Ω in the other direction.

CARRY OUT 4R CHECKS

ASYMMETRIC RECTIFIER TEST



CARRY OUT 3D CHECKS.

Isolate the high voltage rectifier assembly from the HV circuit. The asymmetric rectifier can be tested using an ohmmeter set to its highest range. Connect the ohmmeter across the terminals A+B of the asymmetric rectifier and note the reading obtained. Reverse the meter leads and note this second reading. If an open circuit is indicated in both directions then the asymmetric rectifier is good. If a asymmetric rectifier is shorted in either direction, then the the asymmetric rectifier is probably faultly and must be replaced with the high voltage rectifier. When the asymmetric rectifier is defective, check whether magnetron, high voltage rectifier, high voltage wire or filament winding of the power transformer is shorted.

CARRY OUT 4R CHECKS

NOTE: FOR MEASUREMENT OF THE RESISTANCE OF THE RECTIFIRE, THE BATTERIES OF THE MEASURING INSTRUMENT MUST HAVE A VOLTAGE AT LEAST 6 VOLTS, BECAUSE OTHERWISE AN INFINITE RESISTANCE MIGHT BE SHOWN IN BOTH DIRECTIONS.

TEST PROCEDURES (CONT'D)

PROCEDURE LETTER	COMPONENT TEST

D — HIGH VOLTAGE CAPACITOR TEST

CARRY OUT 3D CHECKS.

A. Isolate the high voltage capacitor from the circuit.
B. Continuity check must be carried out with measuring instrument which is set to the highest resistance range.
C. A normal capacitor shows continuity for a short time (kick) and then a resistance of about 10 M Ω after it has ben charged.
D. A short-circuited capacitor shows continuity all the time.
E. An open capacitor constanlly shows a resistance about 10 M Ω because of its internal 10 M Ω resistance.
F. Whe the internal wire is opened in the high voltage capacitor, the capacitor shows an infinite resistance
G. The resistance across all the terminals and the chassis must be inifinte when the capacitor is normal.

If incorrect readings are obtained, the high voltage capacitor must be replaced.

CARRY OUT 4R CHECKS

E — SWITCH TEST

CARRY OUT 3D CHECKS.

Isolate the switch to be tested and using an ohmmeter check between the terminals as described in the following table.

Table: Terminal Connection of Switch

Plunger Operation	COM to NO	COM to NC
Released	O.C.	S.C.
Depressed	S.C.	O.C.

COM; Common terminal
NO ; Normally open termianl
NC : Normally closed terminal
S.C.; Short circuit
O.C.; Open circuit

If incorrect readings are obtained, make the necessary switch adjustment or replace the switch.

CARRY OUT 4R CHECKS.

F — BLOWN 20A SPECIAL FUSE

CARRY OUT 3D CHECKS

If the 20A special fuse F is blown, there is a shorts or grounds in electrical parts or wire harness. Check them and replace the defective parts or repair the wire harness.

CARRY OUT 4R CHECKS

CAUTION: Only replace fuse point with the correct value replacement.

G1 — BLOWN FUSE F1 F6.3A

CARRY OUT 3D CHECKS

If the ovens internal fuse F1 F6.3A is blown when the door is opened, check the 1st latch switch, monitor switch and monitor resistor.

If the fuse F1 F6.3A is blown by incorrect door switching replace the defective switch(s) and the fuse F1 F6.3A.

CARRY OUT 4R CHECKS

CAUTION: Only replace fuse with the correct value replacement.

TEST PROCEDURES (CONT'D)

PROCEDURE LETTER	COMPONENT TEST

G2 — BLOWN FUSE F2 F6.3A

CARRY OUT 3D CHECKS

If the fuse F2 F6.3A is blown, there is a short in the asymmetric rectier or there is a ground in wire harness. A short in the asymmetric rectifier may be occured due to short or ground in H.V. rectifier, magnetron, power transformer, H.V. capacitor or H.V. wire. Check them and replace the defective parts or repair the wire harness.

CARRY OUT 4R CHECKS

CAUTION: Only replace fuse F2 F6.3A with the correct value replacement.

G3 — BLOWN FUSE F3 F6.3A

CARRY OUT 3D CHECKS

If the fuse F3 F6.3A is blown, the inverter unit is defective, or there is a short or grounds in the step-down transformer or wire harness.
Check them and replace the defective parts or repair the wire harness.

CARRY OUT 4R CHECKS

CAUTION: Only replace fuse F3 F6.3A with the correct value replacement.

H — INVERTER UNIT TEST

CARRY OUT AS FOLLOWS BEFORE REPLACING INVERTER UNIT.

1. Set the oven at 500W output power.
2. Operate the oven

CAUTION: DO NOT OPERATE THE OVEN WITHOUT THE OUTER CASE CABINET.

3. Measure the microwave output power, referring to TEST PROCEDURE A2.
4. If the microwave output power is less than 500W ± 15%, carry out the following procedure.
5. CARRY OUT 3D CHECKS.
6. Check the fuse F3 F6.3A, referring to TEST PROCEDURE G3
7. If fuse F3:.us off; F6.3A, is normal, check the wire harness to the step-down transformer T2
8. If the wire harness is normal, check the step-down transformer referring to TEST PROCEDURE I.
9. If the step-down transformer T2is normal, check the magnetron 2 MG2 referring to TEST PROCEDURE A2.

CAUTION: DO NOT MEASURE THE OUTPUT POWER AT THIS TIME.

10. If the magnetron 2 MG2 is normal, curry out the following procedure.
11. Disconnect the wire leads from TAB1 and TAB2 of inverter unit. Make sure that the leads remain isolated from other oven components and chassis. (Use insulation tape if neccessary.)
12. Operate the oven at 500W output power setting.
13. Check the output voltage of the step-down transformer T2. It must be 120 volts.
14. If the output voltage is normal, check the output signal of the connector L on the control unit.
15. If the control unit is normal, replace the inverter unit RF
16. CARRY OUT 4R CHECKS.

WARNING: DO NOT TOUCH THE COMPONENTS OF INVERTER UNIT WHILE INVERTER UNIT IS ENERGIZED. IT IS DANGER BECAUSE THIS HAS HIGH VOLTAGE COMPONENTS.

TEST PROCEDURES (CONT'D)

PROCEDURE LETTER	COMPONENT TEST

I STEP-DOWN TRANSFORMER TEST

CARRY OUT 3D CHECKS.

Disconnect the all leads to the step-down transformer.
Using an ohmmeter and set on a low range, it is possible to check the continuity of winding.
The following readings should be obtained.

Between the terminal	Resistance
0V -- 120V	Approx. 1.5 Ω
0V -- 220V	Approx. 2.8 Ω

If incorrect readings are obtained, the step-down transformer is probably faulty and should be replaced.

CARRY OUT 4R CHECKS.

J MONITOR RESISTOR AND SURGE RESISTOR TEST

CARRY OUT 3D CHECKS.

Disconnect the leads from the relay unit or surge resistor.
Using an ohmmeter and set on a low range.
Check between the terminals of the monitor resistor or surge resistor as described in the following table.

Table: Resistance

Resistor	Resistance
Monitor resistor	Approx. 3.6 Ω
Surge resistor	Approx. 10 Ω

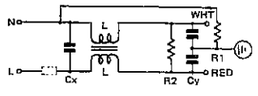
If incorrect readings are obtained, replace the monitor resistor or surge resistor

CARRY OUT 4R CHECKS.

K NOISE FILTER TEST

CARRY OUT 3D CHECKS

Disconnect the leads from the terminals of the noise filter.
Using an ohmmeter, check between the terminals as described in the following table.



R1: 10 Mohm ± 20% R2: 680 Kohm ± 20%

L (min)	Cx ±20%	Cy ± 20%
1.0 mH	1.0 µF	4700pF

MEASURING POINTS	INDICATION OF OHMMETER
Between N and L	Approximately 680k Ω
Between terminal N and WHITE	Short circuit
Between terminal L and RED	Short circuit

If incorrect readings are obtained, replace the noise filter unit. CARRY OUT 4R CHECKS

L TEMPERATURE FUSE OR THERMAL CUT-OUT TEST

CARRY OUT 3D CHECKS

Disconnect the leads from the terminals of the temp. fuse or thermal cut-out. Then using an ohmmeter, make a continuity test across the each two terminals as described in the table below.

TEST PROCEDURES (CONT'D)

PROCEDURE LETTER	COMPONENT TEST

CARRY OUT 4R CHECKS

Table: Temperature Fuse or Thermal Cut-out Test

Parts Name	Temperature of "ON" condition (closed circuit). (°C)	Temperature of "OFF" condition (open circuit). (°C)	Indication of ohmmeter (When room temperature is approx. 20 °C.)
Temp. fuse 150 °C (TF1 or TF2)	This is not resetable type.	Above 150 °C	Closed circuit
Thermal cut-out 115 °C TC1	Below -20 °C	Above 115 °C	Closed circuit.
Thermal cut-out 145 °C TC2	Below -20 °C	Above 145 °C	Closed circuit.
Thermal cut-out 150 °C TC3	Below 120 °C	Above 150 °C	Closed circuit.

If incorrect readings are obtained, replace the temp. fuse or thermal cut-out.

An open circuit thermal cut-out TC3 indicates that the oven has overheated, this may be due to resisted ventilation or locked cooling fan.

An open circuit temperature fuse TF1 or TF2 indicates that the magnetron has overheated, this may be due to resistricted ventilation, cooling fan failure or a fault condition within the magnetron or HV circuit.

An open circuit thermal cut-out TC1 indicates that the inverter unit RF has over heated, this may be due to resisted ventilation or cooling fan failure.

An open circuit thermal cut-out TC2 indicates that the convection motor winding has overheated, this may be due to resisted ventilation or locked convection fan.

M MOTOR WINDING TEST

CARRY OUT 3D CHECKS

Disconnect the leads from the motor.
Using an ohmmeter, check the resistance between the two terminals as described in the table below.

Table: Resistance of Motor

Motors	Resistance
Fan motor 1 FM1	Approximately 169 ohms
Fan motor 2 FM2	Approximately 72 ohms
Turntable motor	Approximately 15.62 kohms
Convection fan motor	Approximately 167 ohms
Rotisserie motor	Approximately 15.9 kohms
Damper motor	Approximately 12.0 kohms

If incorrect readings are obtained, replace the motor.
(Also refer to test procedure N)

CARRY OUT 4R CHECKS

PROCEDURE LETTER	COMPONENT TEST

N LIVE TEST FOR MOTOR WINDINGS

CAUTION: **The following procedure requires the oven to be connected to the supply and should only be used if the relevant "cold" checks for the motor under test are inconclusive.**

1. CARRY OUT 3D CHECKS
2. Disconnect the leads from the primary of the power transformer and TAB1 and TAB2 of inverter unit RF. Make sure that the leads remain isolated from other oven components and chassis. (Use insulation tape if necessary.)
3. Connect a voltmeter, set to 250V AC, across the motor terminals. (Refer to the relevant motor test procedure or pictorial diagram for the correct terminal numbers.)
4. Arrange the meter in a position where it can be read during the test. (Do not touch the meter, meter leads or oven circuitry while the oven is active.)
5. Close the oven door.
6. Set the relevant timer for about three (3) minutes, set the power level to HIGH and push the START button. (Push the ROTISSERIE COOKING key before pushing START button when testing the rotisserie motor.
7. Note the reading on the meter and carefully observe the motor under test to see if it is turning.
8. CARRY OUT 3D CHECKS
9. Remove test meter leads.
10. Reconnect the leads to the primary of the power transformer and TAB1 and TAB2 of inverter unit RF.

If a reading of 220 volts AC was obtained (step 7) but the motor was not turning then it is faulty and should be replaced. If the meter indicated that no supply was present then the wiring to the motor should be checked for continuity.

O CONVECTION HEATING ELEMENT AND GRILL HEATING ELEMENT TEST

CARRY OUT 3D CHECKS

Before carring out the following tests make sure the heating element is fully cool.

1. Resistance of heating element
   Disconnect the wire leads to the heating element to be tested. Using ohmmeter with low resistance range. Check the resistance across the terminals of the heating element as described in the folowing table.

Table: Resistance of heater

Parts name	Resistance
Convection heating element	Approximately 30 Ω
Grill heating elements connected in series (GH+GH)	Approximately 48 Ω (Each element's resistance is approx. 24 Ω)

2. Insulation resistance
   Disconnect the wire leads to the heating element to be tested. Check the insulation resistance between the element and cavity using a 500V - 100M Ω insulation tester. The insulation resisitance should be more than 10M Ω in the cold start.

If the results of above test 1 and/or 2 are out of above specifications, the heating element is probably faulty and should be replaced.

CARRY OUT 4R CHECKS

PROCEDURE LETTER	COMPONENT TEST

P THERMISTOR TEST

CARRY OUT 3D CHECKS

Disconnect connector-E from the CPU unit. Measure the resistance of the thermistor with an ohmmeter. Connect the ohmmeter leads to Pin No's E-4 and E-5.

Room Temp.	Resistance
68 °F(20 °C) - 86 °F(30 °C)	Approx. 326k Ω - 175k Ω

If the meter does not indicate above resistance, replace the thermistor.

CARRY OUT 4R CHECKS

Q RELAY TEST

CARRY OUT 3D CHECKS

Disconnect the leads from the primary of the power transformer, and TAB1 and TAB2 of inverter unit RF.
Make sure that the leads remain isolated from other oven components and chassis.(Use insulation tape if necessary.)
Reconnect the supply.

Check voltage between Pin Nos. 5 and 7 of the 4-pin connector (A) on the control unit with an A.C. voltmeter. The meter should indicate 220 volts, if not check oven circuit.

Shut-off, Cook and Heater Relay Test
These relays are operated by D.C. voltage.
Check voltage at the relay coil with a D.C. voltmeter during the microwave cooking or convection cooking operation.
DC. voltage indicated .....Defective relay.
DC. voltage not indicated .....Check diode which is connected to the relay coil. If diode is good, control unit is defective.

RELAY SYMBOL	OPERATIONAL VOLTAGE	CONNECTED COMPONENTS
RY1	Approx. 13 V.D.C.	Main relay
RY2	Approx. 12 V.D.C.	Cooling fan motor
RY3	Approx. 14 V.D.C.	Damper motor
RY4	Approx. 12 V.D.C.	Oven lamp
RY5	Approx. 14 V.D.C.	Rotisserie motor/Turntable motor selection
RY6	Approx. 14 V.D.C.	Convection motor
RY7	Approx. 12 V.D.C.	Convection heater
RY8	Approx. 12 V.D.C.	Grill heater
RY9	Approx. 13 V.D.C.	Surge resistor
RY10	Approx. 13 V.D.C.	Step down transformer
RY11	Approx. 12 V.D.C.	Power transformer

CARRY OUT 4R CHECKS

(RD82R06U)

R TOUCH CONTROL PANEL ASSEMBLY TEST

The touch control panel consists of circuits including semiconductors such as LSI, ICs, etc. Therefore, unlike conventional microwave ovens, proper maintenance cannot be performed with only a voltmeter and ohmmeter. In this service manual, the touch control panel assembly is divided into two units, Control Unit and Key Unit , troubleshooting by unit replacement is described according to the symptoms indicated.
1. Key Unit.

TEST PROCEDURES (CONT'D)

PROCEDURE LETTER	COMPONENT TEST

The following symptoms indicate a defective key unit. Replace the key unit.
a) When touching the pads, a certain pad produces no signal at all.
b) When touching a number pad, two figures or more are displayed.
c) When touching the pads, sometimes a pad produces no signal.

2. Control Unit
The following symptoms indicate a defective control unit. Replace the control unit.
2-1 Programming problems.
a) When touching the pads, a certain group of pads do not produce a signal.
2-2 Display problems.
a) For a certain digit, all or some segments do not light up.
b) For a certain digit, brightness is low.
c) Only one indicator does not light up.
d) The corresponding segments of all digits do not light up; or they continue to light up.
e) Wrong figure appears.
f) A certain group of indicators do not light up.
g) The figure of all digits ficker.
2-3 Other possible problems caused by defective control unit.
a) Buzzer does not sound or continues to sound.
b) Clock does not operate properly.
c) Cooking is not possible.
d) Proper temperature measurement is not obtained.

(RD82S02U)

S **PROCEDURES TO BE TAKEN WHEN THE FOIL PATTERN ON THE PRINTED WIRING BOARD (PWB) IS OPEN.**

To protect the electronic circuits, this model is provided with a fine foil pattern added to the primary on the PWB, this foil pattern acts as a fuse. If the foil pattern is open, follow the troubleshooting guide given below for repair.

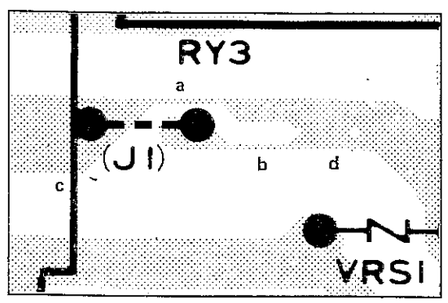
Problem: POWER ON, indicator does not light up.

CARRY OUT 3D CHECKS

Disconnect the leads from the primary of the power transformer. Make sure that the leads remain isolated from other oven components and chassis.(Use insulation tape if necessary.)
Reconnect the supply.

STEPS	OCCURANCE	CAUSE OR CORRECTION
1	The rated voltage is not applied to POWER terminal of CPU connector (CN-A)	Check supply voltage and oven power cord.
2	The rated voltage is applied to primary side of T/C transformer.	T/C transformer or secondary circuit defective. Check and repair.
3	Only pattern at "a" is broken.	*Insert jumper wire 1 and solder. (CARRY OUT 3D CHECKS BEFORE REPAIR)
4	Pattern at "a" and "b" are broken.	*Insert the coil RFILNA003DRE0 between "c" and "d". (CARRY OUT 3D CHECKS BEFORE REPAIR)

NOTE:* At the time of these repairs, make a visual inspection of the varistor for burn damage and test the T/C transformer with an ohmmeter for the presence of layer short-circuit (check primary coil resistance).
If any abnormal condition is detected, replace the defective parts.



CARRY OUT 4R CHECKS

TEST PROCEDURES (CONT'D)

PROCEDURE LETTER	COMPONENT TEST

(RD82X05U)

T **MAINS RELAY RY1 TEST**

CARRY OUT 3D CHECKS

Disconnect the leads to terminals 5 and 6. connect an ohmmeter across the terminals 5 and 6, a reading of approximately 75 ohms should be indicated. If this is not the case then the relay coil is probably faulty and the relay should be replaced.

CARRY OUT 4R TESTS

Relay contact test for open circuit:

Before proceeding with this part of the test, check the relay coil as outlined above.

WARNING: This test requires the oven to be operated with supply connected. Follow the instruction below carefuly.

1. CARRY OUT 3D CHECKS
2. Disconnect the leads to the primary of the power transformer, and TAB1 and TAB2 of inverter unit RF.
3. Disconnect the leads from terminals 1 and 2 of the mains relay, make sure that these leads remain isolated from other components and the oven chasiss (use insulation tape if necessary). Do not disconnect leads from terminal 3 and 4.
4. Securely clip the leads of an ohmmeter across terminals 1 and 2 of the mains relay. (Make sure the meter can be read easily without being touched during test)
5. Close the door of the oven.
6. Connect the supply.
7. Set the MICROWAVE TIMER to 1 minute and press the START key
8. Without touching the meter or any part of the oven make a note of the reading indicated.
9. Set the MICROWAVE TIMER to 0 (zero).
10. CARRY OUT 3D CHECKS
11. Disconnect the meter from terminals 1 and 2 of the mains relay, clip instead to terminals 3 and 4. And reconnect the leads to terminals 1 and 2.
12. Repeat steps 5, 6, 7, 8, and 9.
13. CARRY OUT 3D CHECKS

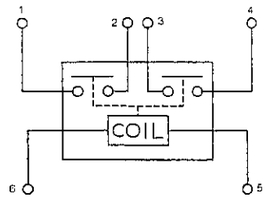
Check results:
Both meter reading should show continuity (short circuit), if either or both the readings show open circuit then the relay contacts are probably faulty and the relay should be replaced.

CARRY OUT 4R CHECKS

Relay contact test for short circuit:

CARRY OUT 3D CHECKS

Isolate terminals 1 and 2, 3 and 4 of the mains relay. Using an ohmmeter, check continuity between terminal 1 and 2 then 3 and 4. A reading of infinite resistance should be obtained. If this is not the case then the relay is probably faulty and should be replaced.



CARRY OUT 4R CHECKS

TEST PROCEDURES (CONT'D)

PROCEDURE LETTER	COMPONENT TEST
U	**SURGE RELAY RY9 OR RELAY RY10 TEST**

CARRY OUT 3D CHECKS

Disconnect the leads to realy unit. Connect an ohmmeter across the coil terminals, a reading of approximately 260 ohms should be indicated. If this is not the case then the relay coil is probably faulty and the relay should be replaced.

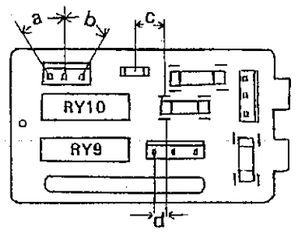
CARRY OUT 4R TESTS

Relay contact test for short circuit:

CARRY OUT 3D CHECKS

Disconnect the leads to relay unit. Using an ohmmeter, check continuity between relay contacts. A reading of infinite resistance should be obtained. If this is not the case then the relay is probably faulty and should be replaced.

CARRY OUT 4R CHECKS



a: Coil terminals for RY10
b: Coil terminals for RY9
c: Relay contacts for RY10
d: Relay contacts for RY9

Relay Unit

TOUCH CONTROL PANEL ASSEMBLY

OUTLINE OF TOUCH CONTROL PANEL

The touch control section consists of the following units as shown in the touch control circuit.

(1) Key Unit
(2) Control Unit

The principal functions of these unit and signal communicated among them are explained below.

Key Unit

The key unit is composed of a matrix, signals generated in the LSI are sent to the key unit through P06, P10, P12 and P14.
When a key pad is touched, a signal is completed through the key unit and passed back to the LSI through R0-R3 to perform the function that was requested.

Control Unit

Control unit consists of LSI(IZA299DR), power source circuit, synchronizing signal circuit, ACL circuit, buzzer circuit, temperature measurement circuit, inverter control circuit and indicator circuit.

1) **LSI**
This LSI controls the temperature measurement signal, key strobe signal, relay driving signal, inverter sibnal for oven function and indicator signal.

2) **Power Source Circuit**
This circuit generates voltage {VC: +5V, VF1: -14V, VF2: -17V, VR:+14V, and VP:-26V} necessary in the control unit.

3) Synchronizing Signal Circuit
The power source synchronizing signal is available in order to compose a basic standard time in the clock circuit.
It incorporates a very small error because it works on commercial frequency.

4) **ACL Circuit**
A circuit to generate a signal which resets the LSI to the initial state when power is applied.

5) **Buzzer Circuit**
The buzzer is responsive to signals from the LSI to emit noticing sounds (key touch sound and completion sound).

6) **Temperature Measurement Circuit (1): Oven**
The temperature in the oven cavity is sensed by thermistor.

The variation of resistance according to sensed temperature is detected by the temperature measurement circuit and the result applied to LSI.
The result of detecting is given to LSI controlling the relay and display.

7) **Door Sensing Switch**
A switch to "tell" the LSI if the door is open or closed.

8) **Relay Circuit**
To drive the magnetron, convection heater, grill heater, fan motor, turntable motor convection motor, damper motor, rotisserie motor, surge relay, step-down transformer relay, main relay, and light the oven lamp

9) **Indicator Circuit**
Indicator element is a Fluorescent Display.
Basically, a Fluorescent Display is a triode having a cathode, a grid and an anode. Usually, the cathode of a Fluorescent Display is directly heated and the filament serves as cathode.
The Fluorescent Display has 6-digits and 16-segments.

10) **Inverter Control Circuit**

DESCRIPTION OF LSI

LSI(IZA299DR)
The I/O signal of the LSI(IZA299DR) is detailed in the following table.

PIN NO.	1	SIGNAL	VREF	I/O	IN

Reference voltage input terminal.
A reference voltage applied to the A/D converter in the LSI.
Connected to VC.

PIN NO.	2	SIGNAL	IN7	I/O	IN

Heating constant compensation terminal.

PIN NO.	3	SIGNAL	IN6	I/O	IN

Inverter data compensation terminal.

PIN NO.	4	SIGNAL	IN5	I/O	IN

Input signal which communicaties the door open/close information to LSI.
Door closed; "L" level signal (0V)
Door opened; "H" level signal (+5V)

PIN NO.	5	SIGNAL	IN4	I/O	IN

Input signal which communicaties the damper open/close information to LSI.
Damper closed; "H" level signal (+5V: VC) Damper opened; "L" level signal (0: GND)

PIN NO.	6	SIGNAL	IN3	I/O	IN

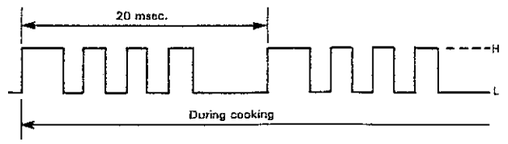
Temperature measurement input: OVEN THERMISTOR.
By inputting DC voltage corresponding to the temperature detected by the thermistor, this input is converted into temperature by the A/D converter built into the LSI.

PIN NO.	7, 8, 9	SIGNAL	IN2, IN1, IN0	I/O	IN

Terminal not used. Connected to GND.

PIN NO.	10	SIGNAL	P47	I/O	OUT

Oven lamp driving signal. (Square Waveform: 50Hz)
The square waveform voltage is delivered to the RY1 driving circuit and relays (RY5, 7, 8, 9, 10, 11) control circuit.

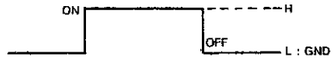


PIN NO.	11	SIGNAL	P46	I/O	OUT

Magnetron High-voltage circuit driving signal.
To turn on and off the cook relay(RY11).
When the power output is more than 500W, the signals holds "H" level during microwave cooking.

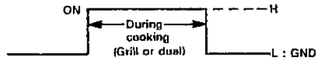
PIN NO.	12	SIGNAL	P45	I/O	OUT

Damper motor relay driving signal.
To turn on and off the shut-off relay (RY3).



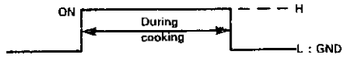
PIN NO.	13	SIGNAL	P44	I/O	OUT

Grill heater driving signal.
To turn on and off the grill heater relay (RY8) "H" level during grill or dual cooking; "L" level otherwise.



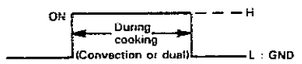
PIN NO.	14	SIGNAL	P43	I/O	OUT

Cooling fan motor driving signal.
To turn on and off the shut-off relay (RY2). "H" level during cooking; "L" level otherwise.



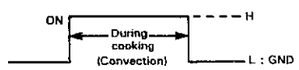
PIN NO.	15	SIGNAL	P42	I/O	OUT

Convection heating driving signal.
To turn on and off the convection heating relay (RY7). "H" level during convection or dual cooking; "L" level otherwise. During convection cooking, the signal becomes "L" level when the temperature of the oven cavity exceeds the predetermined temperature.



PIN NO.	16	SIGNAL	P41	I/O	OUT

Convection motor driving signal.
To turn on and off shut-off relay (RY5). "H" level during convection; "L" level otherwise.



PIN NO.	17	SIGNAL	P40	I/O	OUT

Step-down transformer driving signal.
To turn on and off step-down transformer relay (RY10). "H" level during microwave cooking; "L" level otherwise.

PIN NO.	18	SIGNAL	P37	I/O	OUT

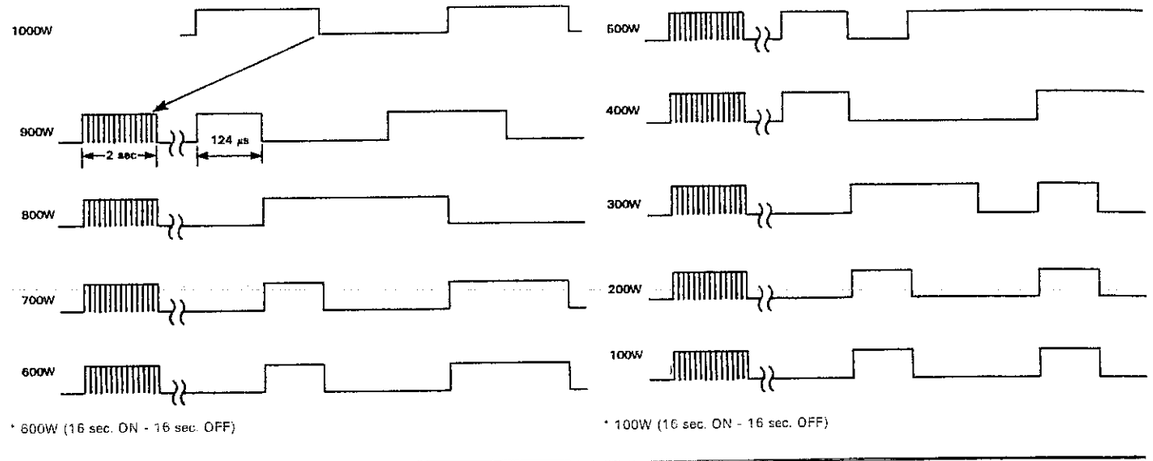
Rotisserie motor/Turntable motor selection signal.
To turn on and off shut-off relay (RY5).
"H" level: Rotisserie motor condition
"L" level: Turntable motor condition

PIN NO.	19	SIGNAL	P36	I/O	OUT

Timing signal output terminal for temperature measurement (OVEN).
"H" level (+5V): Thermistor OPEN timing
"L" level (GND): Temperature measuring timing. (Convection and Grill cooking)

PIN NO.	20	SIGNAL	P35	I/O	OUT

Data output signal for Inverter. **The relationship between signals and power output are as follows.**



* 600W (16 sec. ON - 16 sec. OFF)
* 100W (16 sec. ON - 16 sec. OFF)

PIN NO.	21	SIGNAL	P34	I/O	OUT

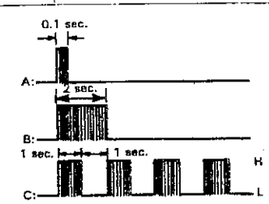
Clock signal output terminal.
Generates the clock signal of 6 pulses which is sinchronised with the data output signal for unverter.

PIN NO.	23	SIGNAL	P33	I/O	OUT

Data complation signal output terminal.
This signal informs the inverter on complation of data signal.

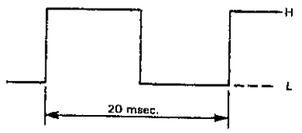
PIN NO.	23	SIGNAL	P32	I/O	OUT

Signal to sound buzzer.
A: Key touch sound (0.1 sec.).
B: Completion sound
C: When the temperature of the oven cavity reaches the preset temperature in the preheating mode, or when the preheating hold time (15 minutes) is elapsed.



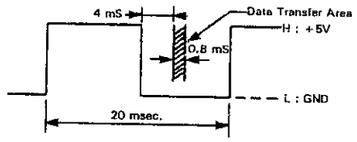
PIN NO.	24	SIGNAL	P31	I/O	IN

Signal synchronized with commercial power source frequency.
This is the basic timing for all time processing of LSI.



PIN NO.	25	SIGNAL	P30	I/O	OUT

Signal synchronized with commercial power source frequency for Inverter.



PIN NO.	26	SIGNAL	CNVSS	I/O	IN

Connected to GND

PIN NO.	27	SIGNAL	RESET	I/O	IN

Auto-clear terminal.
Signal is input to reset the LSI tio the initial state when power is supplied. Temporarily set to "L" level the moment power is supplied, at this time the LSI is reset. Thereafter set at "H" level.

PIN NO.	28	SIGNAL	XIN	I/O	IN

Internal clock oscillation frequency input setting.
The internal clock frequency is set by inserting the ceramic filter oscillation circuit with respect to XOUT terminal.
(RD93EA2U)

PIN NO.	29	SIGNAL	XOUT	I/O	OUT

Internal clock oscillation frequency control output.
Output to control oscillation input of XIN.

(RD93EA1U)

PIN NO.	30, 31	SIGNAL	XCIN / XCOUT	I/O	IN / OUT

Terminal not used.

PIN NO.	32	SIGNAL	Vss	I/O	IN

Power source voltage.
Connected to GND (0V).

PIN NO.	33	SIGNAL		I/O	OUT

Terminal not used.

PIN NO.	34	SIGNAL	R3	I/O	IN

Signal coming from touch key.
When either one of G-1 line keys on key matrix is touched, a corresponding signal out of P06, P10, P12 and P14 will be input into R3.
When no key is touched, the signal is held at "L" level.

PIN NO.	35	SIGNAL	R2	I/O	IN

Signal similar to R3.
When either one of G-2 line keys on key matrix is touched, a corresponding signal will be input into R2.

PIN NO.	36	SIGNAL	R1	I/O	IN

Signal similar to R3.
When either one of G-3 line keys on key matrix is touched, a corresponding signal will be input into R1.

PIN NO.	37	SIGNAL	R0	I/O	IN

Signal similar to R3.
When either one of G-4 line keys on key matrix is touched, a corresponding signal will be input into R0.

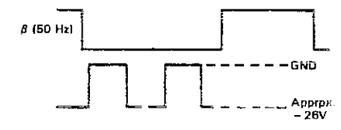
PIN NO.	38	SIGNAL	VP	I/O	IN

Anode (segment) of Florescent Display illumination voltage: -26V.
VP voltage of power source circuit input.

PIN NO.	39, 40, 41	SIGNAL	P17, P16, P15	I/O	OUT

Segment data signals.
The relation between signals and indicators are follows:

Signal		Segment	Signal		Segment
P17	.....	LB1	P07	.....	h
P16	.....	LB2	P06	.....	g
P15	.....	LB3	P05	.....	f
P14	.....	UB1	P04	.....	e
P13	.....	I	P03	.....	d
P12	.....	k	P02	.....	c
P11	.....	j	P01	.....	b
P10	.....	i	P00	.....	a



PIN NO.	42	SIGNAL	P14	I/O	OUT

Segment data signal.
Signal similar to P17
Key strobe signal.
Signal applied to touch-key section.
A pulse signal is input to R0 – R3 terminal while one of G-5 line keys on key matrix is touched.

PIN NO.	43	SIGNAL	P13	I/O	OUT

Segment data signal.
Signal similar to P17

PIN NO.	44	SIGNAL	P12	I/O	OUT

Segment data signal.
Signal similar to P17
Key strobe signal.
Signal applied to touch-key section.
A pulse signal is input to R0 – R3 terminal while one of G-6 line keys on key matrix is touched.

PIN NO.	45	SIGNAL	P11	I/O	OUT

Segment data signal.
Signal similar to P17

PIN NO.	46	SIGNAL	P10	I/O	OUT

Segment data signal.
Signal similar to P17
Key strobe signal.
Signal applied to touch-key section.
A pulse signal is input to R0 – R3 terminal while one of G-7 line keys on key matrix is touched.

PIN NO.	47	SIGNAL	P07	I/O	OUT

Segment data signal.
Signal similar to P17

PIN NO.	48	SIGNAL	P06	I/O	OUT

Segment data signal.
Signal similar to P17
Key strobe signal.
Signal applied to touch-key section.
A pulse signal is input to R0 – R3 terminal while one of G-8 line keys on key matrix is touched.

PIN NO.	49	SIGNAL	P05	I/O	OUT

Segment data signal.
Signal similar to P17

PIN NO.	50	SIGNAL	P04	I/O	OUT

Segment data signal.
Signal similar to P17
Key strobe signal.
Signal applied to touch-key section.
A pulse signal is input to R0 – R3 terminal while one of G-9 line keys on key matrix is touched.

PIN NO.	51, 52, 53, 54	SIGNAL	P03, P02, P01, P00	I/O	OUT

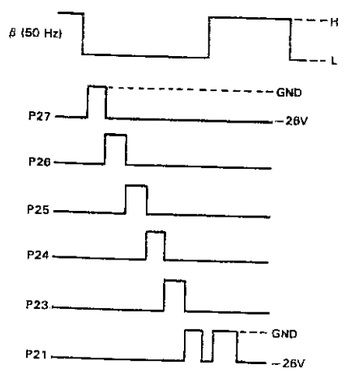
Segment data signal.
Signal similar to P17

PIN NO.	55, 56, 57, 58, 59	SIGNAL	P27, ..., P23	I/O	OUT

Digit selection signal.
The relation between digit signal and digit are as follows:

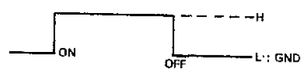
Digit signal		digit
P27	.....	1st
P26	.....	2nd
P25	.....	3rd
P24	.....	4th
P23	.....	5th
P21	.....	6th

Normaly, one pulse is output in every β periode, and input to the grid of the Fluorescent Display.



PIN NO.	60	SIGNAL	P22	I/O	OUT

Mains relay driving signal.
To turn on and off the mains relay.

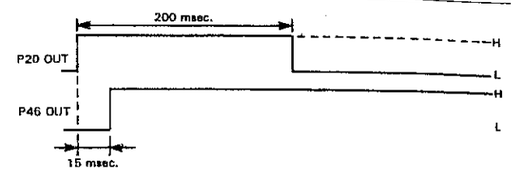


PIN NO.	61	SIGNAL	P21	I/O	OUT

Digit selection signal.
Signal similar to P27.

PIN NO.	62	SIGNAL	P20	I/O	OUT

Surge limiting relay driving signal.
The surge limiting relay is designed to turn on 15 msec. earlier than the cook relay (RY11).



PIN NO.	63, 64	SIGNAL	AVCC, VSS	I/O	IN

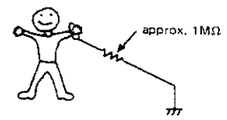
Connected to VC.

SERVICING

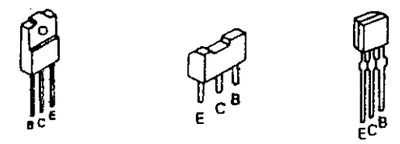
1. Precautions for Handling Electronic Components

This unit uses PMOS LSI in the integral part of the circuits. When handling these parts, the following precautions should be strictly followed.
PMOS LSI have extremely high impedance at its input and output terminals. For this reason, it is easily influenced by the surrounding high voltage power source, static electricity charge in clothes, etc,and sometimes it is not fully protected by the built-in protection circuit.

1) When storing and transporting, thoroughly wrap them in aluminum foil.
   Also wrap all PW boards containing them in aluminium foil.
2) When soldering, ground the technician as shown in the figure and use grounded soldering iron and work table.



2. Shapes of Electronic Components



Transistor	Transistor	Transistor
2SD1266	2SB910M 2SD1228M	DTA143ES DTA114ES DTC114YS DTC143ES

3. Servicing of Touch Control Panel

We describe the procedures to permit servicing the touch control panel of the microwave oven and the cautions you must consider when doing so.

To carry the servicing, power supply to the touch control panel is available either from the power line of the oven proper itself of from an external power source.

(1) Servicing the touch control panel with power supply from the oven proper:

CAUTION:
THE HIGH VOLTAGE TRANSFORMER OF THE MICROWAVE OVEN IS STILL ALIVE TO GIVE DANGER DURING SERVICING.

Therefore, when checking the performance of the touch control panel,put the outer cabinet on the oven proper to keep you from touching the high tension transformer, or unplug the primary terminal (connector) of the high voltage transformer to turn it off; and the end of such connector must be insulated with an insulating tape. After servicing, be sure to replace the leads to their original locations.

A. On some models, the power supply cord between the touch control panel and the oven proper is so short that they can't be separated from each other.
   For those models, therefore, check and repair all the controls (with the sensor-related ones included) of the touch control panel while keeping it connected with the oven proper.
B. On some models, on the other hand, the power supply cord between the touch control panel and the oven proper is so long that they may be separated from each other. For those models, therefore, it is a;;pwed to check and repair the controls of the touch control panel while keeping it apart from the oven proper;in this case you must short both ends of the door sensing (on PWB) of the touch control panel with a jumper, which brings about an operational state that is equivalent to that with the oven door being closed.
   As to the sensor-related controls of the touch control panel, their checking is allowed if dummy resistor(s) whose resistance equal to that of those controls are used.

(2) Servicing the touch control panel with power supply from an external power source:
Disconnect the touch control panel completely from the oven proper,and short both ends of the door sensing (on PWB) of the touch control panel,which brings about such an operational state that is equivalent to that with the oven door being closed. And connect an external power source to the power input terminal of the touch control panel, and then it is allowed to check and repair the controls of the touch control panel;as in the case of (1)-B above, it is here also possible to check the sensor-related controls of the touch control panel by using the dummy resistor(s).

4. Servicing Tools
Tools required to service the touch control panel assembly.
1) Soldering iron: 30W
(To prevent leaking current it is recommended to use a soldering iron with a grounding terminal.)
2) Oscilloscope: Single beam, frequency range: DC - 10MHz type or more advanced model.
3) Others: Hand tools

5. Other Precautions
1) When turning on the power source of the control unit, remove the aluminum foil applied for preventing static electricity.
2) Connect the connector of the indicator and key unit to the control unit taking care that the lead wires are not twisted.
3) After aluminum foil is removed, take extra care that abnormal voltage due to static electricity etc. is not applied to the input or output terminals.
4) Attach connectors, electrolytic capacitors, etc. to PWB, making sure that all connections are tight.
5) Be sure to use specified components where high precision is required.

COMPONENT REPLACEMENT AND ADJUSTMENT PROCEDURE

WARNING: Avoid possible exposure to microwave energy. Please follow the instructions below before operating the oven.

1. CARRY OUT 3D CHECKS.
2. Make sure that a definite "click" can be heard when the microwave oven door is unlatched. (Hold the door in a closed position with one hand, then push the door open button with the other, this causes the latch heads to rise, it is then possible to hear a "click" as the door switches operate.)
3. Visually check the door and cavity face plate for damage (dents, cracks, signs of arcing etc.).

Carry out any remedial work that is necessary before operating the oven.

Do not operate the oven if any of the following conditions exist;

1. Door does not close firmly.
2. Door hinge, support or latch hook is damaged.
3. The door gasket or seal is damaged.
4. The door is bent or warped.
5. There are defective parts in the door interlock system.
6. There are defective parts in the microwave generating and transmission assembly.
7. There is visible damage to the oven.

Do not operate the oven:
1. Without the RF gasket (Magnetron).
2. If the wave guide or oven cavity are not intact.
3. If the door is not closed.
4. If the outer case (cabinet) is not fitted.

Please refer to 'OVEN PARTS, CABINET PARTS, DOOR PARTS', when carrying out any of the following removal procedures:

OUTER CASE REMOVAL

To remove the outer case, proceed as follows.
1. Disconnect oven from power supply.
2. Open the oven door and wedge it open.
3. Remove the two (2) screws holding the exhaust duct to the rear cabinet.
4. Remove the exhaust duct from the rear cabinet.
5. Remove the screws from rear and along the side edge of case.
6. Slide the entire case back about 1 inch (3cm) to free it from retaining clips on the cavity face plate.
7. Lift the entire case from the oven.
8. Discharge the HV capacitor before carring out any further work.
9. Do not operate the oven with the outer case removed.

N.B.; Step 1,2 and 8 form the basis of the 3D checks.

CAUTION: DISCHARGE HIGH VOLTAGE CAPACITOR BEFORE TOUCHING ANY OVEN COMPONENTS OR WIRING.

POSITIVE LOCK® CONNECTOR REMOVAL

Pushing the lever of positive lock® connector, Pull out the positive lock connector.

CAUTION: When you (Service engineers) connect the positive lock® connectors to the terminals, connect the positive lock® so that the lever face you(Service engineer).

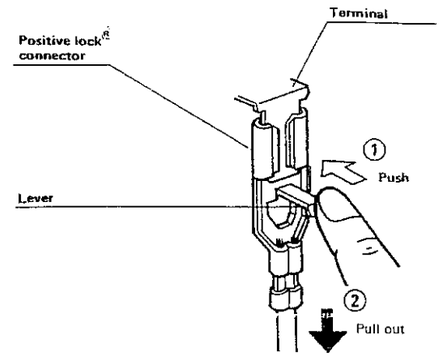


Figure C-1. Positive lock® connector

HIGH VOLTAGE RECTIFIER ASSEMBLY AND HIGH VOLTAGE CAPACITOR REMOVAL

1. CARRY OUT 3D CHECKS
2. Disconnect the high voltage wire and the lead of the power transformer from the magnetron.
3. Remove the lead of the power transformer from the ferrite core.
4. Cut and remove the wire tie holding the high voltage wire to the ferrite core.
5. Remove the high voltage wire coiled around the ferrite core from the ferrite core.
6. Disconnect the high voltage wire of the high voltage rectifier assembly from the power transformer, referring to Figure C-1. Positive lock connector.
7. Remove the single (1) screw holding the capacitor holder to the bottom plate.
8. Remove the capacitor holder with high voltage rectifier assembly and high voltage capacitor from the bottom plate.
9. Remove the single (1) screw holding the earth side terminal of high voltage rectifier assembly.
10. Disconnect the leads from the high voltage capacitor.
11. Disconnect the high voltage wire of the high voltage rectifier assembly from the lead of the power transformer.
12. Now, the high voltage rectifier and high voltage capacitor are free.

CAUTION: WHEN REPLACING HIGH VOLTAGE RECTIFIER ASSEMBLY, ENSURE THAT THE CATHODE (EARTH) CONNECTION IS SECURELY FIXED TO THE CAPACITOR HOLDER WITH A EARTHING SCREW.

POWER TRANSFORMER REMOVAL

1. CARRY OUT 3D CHECKS
2. Remove the two (2) screws holding the inverter unit angle to the bottom plate and fan motor assembly 2.
3. Remove the single (1) screw holding the relay unit angle to the rear cabinet.
4. Draw out the inverter unit assembly with the relay unit assembly from the oven.
5. Disconnect the wire leads from the fan motor assembly 2.
6. Remove the two (2) screws holding the fan motor assembly 2 to the magnetron.
7. Release the tab of the fan motor assembly 2 from the hole of the top of the oven cavity.
8. Remove the fan motor assembly 2.
9. Disconnect the wire leads of the power transformer.
10. Disconnect the high viltage wire of the high voltage rectifier assembly from the power transfomer, referring to the Figure C-1. Positive lock connector.
11. Disconnect the high viltage wire and the lead of the power transformer from the magnetron 1.
12. Remove the lead of the power transformer from the ferrite core.
13. Disconnect the other lead of the power transformer from the hogh voltage capacitor. When this lead is disconnected, the high voltage wire of the high voltage rectifier assembly is also disconnected together with this lead.
14. So disconnect the high voltage wire from the lead of the power transformer.
15. Remove the two (2) screws holding the power transformer tothe bottom plate.
16. Remove the power transformer from the bottom plate.
17. Now, the power transfomer is free.

STEP-DOWN TRANSFORMER REMOVAL

1. CARRY OUT 3D CHECKS
2. Loosen the single (1) screw holding the earth angle to the rear cabinet.
3. Release the power supply cord from the rear cabinet.
4. Remove the eight (8) screws holding the rear cabinet to the bottom plate, relay unit angle, partition plate B and convection fan duct.
5. Remove the rear cabinet.
6. Disconnect the leads from the step-down transformer.
7. Remove the two (2) screws holding the step-down transformer to the bottom plate.
8. Now, the step-down transfomer is free.

INVERTER UNIT REMOVAL

1. CARRY OUT 3D CHECKS
2. Remove the single (1) screw holding the earth leads to the magnetron 2.
3. Remove the single (1) screw holding the relay unit angle to the inverter unit angle.
4. Remove the two (2) screws holding the inverter unit angle to the fan motor assembly 2 and the bottom plate.
5. Disconnect the leads from the magnetron 2.
6. Disconnect the leads from the inverter unit.
7. Remove the two (2) screws holding the inverter unit to the inverter unit angle.
8. Remove the inverter unit from the inverter unit angle.
9. Now, the inverter unit is free.

MAGNETRONS REMOVAL

CAUTION:DO NOT MIX UP THE MAGNETRON 1 AND MAGNETRON 2 WHEN YOU REPLACE THE EACH OR BOTH OF THEM, THERE ARE USING QUITE DEFFERENT TYPE OF MAGNETRONS.

MAGNETRON 1 REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the fan motor assembly 2, referring to from the item 2 to 8 of "POWER TRANSFORMER REMOVAL".
3. Remove the damper duct assembly, referring to from the item 1 to 6 of "DAMPER MOTOR AND DAMPER SWITCH REMOVAL".
4. Carefully remove four (4) screws holding magnetron 1 to waveguide. When removing these screws, prevent the magnetron 1 from falling.
5. Remove the magnetron from the waveguide with care so the magnetron antenna should not be hit by any metal object around the antenna

CAUTION: WHEN REPLACING THE MAGNETRON, BE SURE THE R.F. GASKET IS IN PLACE AND THE MAGNETRON MOUNTING SCREWS ARE TIGHTENED SECURELY.

MAGNETRON 2 REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the inverter unit assembly, referring to from the item 2 to 4 of "INVERTER UNIT REMOVAL".
3. Remove the fam motor assembly 2, referring to from the item 5 to 8 of "POWER TRANSFORMER REMOVAL".
4. Remove the magnetron 2, referring to item 4 and 5 of "MAGNETRON 1 REMOVAL".

CAUTION: WHEN REPLACING THE MAGNETRON, BE SURE THE R.F. GASKET IS IN PLACE AND THE MAGNETRON MOUNTING SCREWS ARE TIGHTENED SECURELY.

CONTROL PANEL REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove one (1) screw holding earth wire to the frange of oven cavity
3. Disconnect the connectors from the control panel.
4. Remove the four (3) screws holding the control panel plate to the oven cavity, the bottom plate and chassis support and remove the control panel
5. Lift up the control panel assembly and pull it forward. Now, the control panel assembly is free.

CONTROL UNIT AND KEY UNIT REMOVAL

1. Remove the control panel from the oven cavity, refering to "CONTROL PANEL REMOVAL".
2. Remove the single (1) screw holding the panel frame to the back plat.
3. Separate the panel frame and back plate.
4. Disconnect the key connector from the control unit.
5. Remove the five (5) screws holding the control unit to the panel frame.
6. Lift up the control unit.
7. Now, the control unit and frame assembly are separated.

FAN MOTOR 1 REPLACEMENT

Removal

1. CARRY OUT 3D CHECKS.
2. Remove the step-down transfomer. referring to "STEP-DOWN TRANSFORMER REMOVAL".
3. Disconnect the leads from magnetron.
4. Remove the power transformer, referring to the "POWER TRANSFORMER REMOVAL".
5. Remove the inverter unit angle, referring to the "INVERTER UNIT REMOVAL".
6. Turn the oven over.
7. Disconnect the leads from the fan motor 1.
8. Remove the snap of the wire ties of the main harness from the fan case assembly.
9. Remove the snap of the wire tie of the low voltage harness from the bottom plate.
10. Remove the three (3) screws holding the lower oven hinge to the bottom plate, and remove the lower oven hinge.
11. Remove the three (3) screws holding the bottom plate to the oven cavity and convection fan duct, and remove the bottom late.
12. Remove the three (3) screws holding the fan case assembly to the bottom plate, and remove the fan case assembly.
13. Remove the two (2) screws holding the bearing to fan case assembly, and remove the bearing.
14. Remove the closs-flow fan cushion D from the fan case assembly.
15. Remove the single (1) screw holding the fan motor angle to the fan case assembly.
16. Remove the closs-flow fan and fan motor 1 togerther from the fan case assembly.
17. Remove the fan motor 1 from the closs-flow fan.
18. Remove the two (2) screws holding the fan motor angle to the fan motor 1.
19. Now, the fan motor 1 is free.

Re-install

1. Re-install the fan motor angle to the fan motor 1 with two (2) screws.
2. Insert the shaft of the fan motor 1 into the rubber packing of the closs-flow fan as show in figure C-2.

CAUTION: FIT THE "D" CUTTING PARTS EACH OTHER.;BR

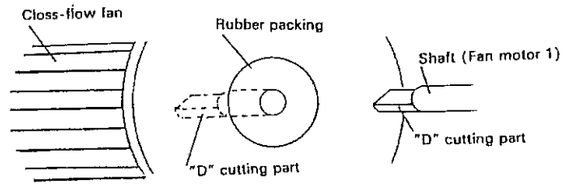


Figure C-2. Closs-flow fan and fan motor 1

3. Re-install the fan motor 1 and closs-flow fan into the fan case assembly.
4. Re-install the fan motor angle to the fan case assembly with single screw.
5. Re-install the bearing to the fan case assembly with two (2) screws.
6. The fan motor shaft can be moved toward its axis direction a little. Therefore, after the fan motor shaft is moved to the arrow direction, adjust the gap A between closs-flow fan and fan case assembly will become 3mm as shown Fig. C-3.

CAUTION: KEEP THE AIR GAP "A" TO BE 3MM. OR THE CLOSS-FLOW FAN WILL HAVE FEW COOLING EFFECTS AND THIS WILL CAUSE THE OTHER TROUBLE.

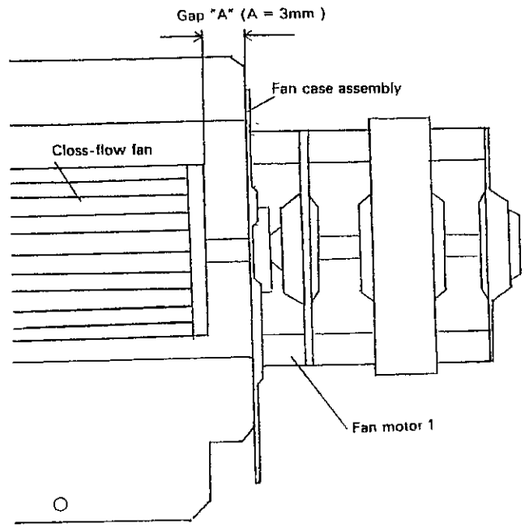


Figure C-3. Adjustment of gap between clos-flow fan and fan case assembly.

7. Re-install the closs-flow fan cushion D to the fan case assembly.
8. Re-install the fan case assembly to the bottom plate with three (3) screws.
9. Re-install the bottom plate to the oven cavity and convection fan duct with three (3) screws.
10. Re-install the lower oven hinge to the bottom plate with three (3) screws.
11. Re-install the snaps of the wire ties of the low voltage harness and main harness to the bottom plate and fan case assembly.
12. Turn the oven over.
13. Re-install the step-down transformer and power transformer to the bottom plate with four (4) screws.
14. Connect the leads to the step-dowm transformer, power transformer fan motor 1, magnetron 1 and H.V. capacitor reffering to the "Pictorial Diagram".
15. Re-install fan motor assembly 2 to the tab of the top of the oven cavity and magnetrons with two (2) screws.
16. Connect the leads to the fan motor assembly 2 reffering to the "Pictorial Diagram".

17. Connect the leads to the inverter unit RF reffering to the "Pictorial Diagram".
18. Connect the leads to the magnetron 2 and earth leads to the magnetron duct with single (1) screw reffering to "Pictorial Diagram".
19. Re-install the inverter unit RF to the bottom plate and fan motor assembly 2 with two (2) screws.
20. Re-install the relay unit angle to the unverter unit RF with single (1) screw.
21. Re-install the rear cabinet to the bottom plate, relay unit angle, partition plate B and convection fan duct with eight (8) screws.
22. Re-install the power supply coed to the rear cabinet reffering to the "POWER SUPPLY CORD REPLACEMENT".
23. Make sure that the door is parallel with bottom line of the oven face plate and the latch head pass through the latch holes correctly.
24. Make sure that the latch switches operate properly.
25. Re-install the outer case to the oven with nine (9) screws.
26. Re-install the exhaust duct to the rear cabinet with two (2) screws

CAUTION:	AFTER FINISHED THE SERVICING OF FAN MOTOR 1, CHECK FOR MICROWAVE LEAKAGE AROUND THE DOOR WITH APPROVED MICROWAVE SERVEY METER (REFER TO MICROWAVE MEASUREMENT PROCEDURE.).

POWER SUPPLY CORD REPLACEMENT

Removal

1. CARRY OUT 3D CHECKS.
2. Loosen the single (1) screw holding the earth angle to the rear cabinet.
3. Disconnect the leads of the power supply cord from the noise filter, referring to the Figure C-1. Positive Lock Connector.
4. Release the power supply cord from the rear cabinet.
5. Now, the power supply cord is free.

Re-install

1. Insert the moulding card stopper of power supply cord into the square hole of the rear cabinet, referring to the Figure C-4. Installation of Power supply cord.
2. Insert the earth wire lead of power supply cord into the earth angle and tight the screw holding the earth angle to the rear cabinet.
3. Connect the brown and blue wire leads of power supply cord to the noise filter correctly, referring to the Pictorial Diagram.

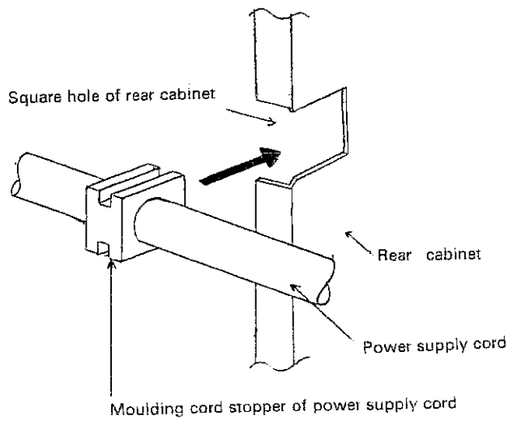


Figure C-4. Replacement of Power Supply Cord

FAN MOTOR ASSEMBLY 2 REMOVAL

Refer to "POWER TRANSFORMER REMOVAL", and carry out from item 1 to 7 of it.

ROTISSERIE MOTOR REMOVAL

1. Refer to "POWER TRANSFORMER REMOVAL", and carry out from item 1 to item 8 of it.
2. Disconnect the leads from the rotissrie motor.
3. Remove two (2) screws holding the rotisserie motor to rotisserie motor angle.
4. Now, the rotisserie motor is free.

DAMPER MOTOR AND DAMPER SWITCH REMOVAL

1. CARRY OUT 3D CHECKS
2. Disconnect the leads from damper motor, damper switch, fan motor assembly 2 and magnetron 1.
3. Release the snaps of the wire ties of the main harness from the damper duct assembly and oven cavity.
4. Make the three (3) tabs of thermal-cover right straight.
5. Remove the single (1) screw holding the damper duct assembly to the magnetron 1.
6. Remove the damper duct assembly with the damper motor and damper switch from the oven.
7. Remove the two (2) screws holding the damper motor to the damper duct assembly. Now, the damper motor is free.
8. Remove the single (1) screw holding the damper switch to the damper duct assembly. Now, the damper switch is free.

CONVECTION HEATING ELEMENT OR CONVECTION FAN MOTOR REMOVAL

1. CARRY OUT 3D CHECKS.
2. Loosen the single (1) screw holding the earth angle to the rear cabinet.
3. Release the power supply cord from the rear cabinet.
4. Remove the eight (8) screws holding the rear cabinet to the convection fan duct, bottom plate and partition plate B.
5. Remove the rear cabinet from the oven.
6. Disconnect the wire leads from the convection heating element, reffering to the "POSITIVE LOCK CONNECTOR REMOVAL".
7. Disconnect the wire leads from the convection motor, thermistor and thermal cut-out.
8. Remove the nine (9) screws holding the convection fan duct to the oven cavity and bottom plate.
9. Remove the convection fan duct from the oven.

CONVECTION HEATING ELEMENT

10. Remove the two(2) screws holding the two convection heating element insulater (A) to the convection fan duct and remove the insulator (A).
11. Remove the two(2) screws holding the convection insulator (B) to the convection fan duct.
12. Remove the two(2) screws holding the convection heating element to the convection insulator (B).
13. Now, the convection heating element is free.

CONVECTION FAN MOTOR

10. Remove the one(1) nut holding the convection fan, washers, pipe and auxiliary fan to the convection fan motor shaft, and remove the convection fan, washers and pipe.
11. Remove the two(2) screws and washers holding the convection motor mounting plate to the thermal cover rear.
12. Remove the pin on the convection fan motor shaft.
13. Remove the two(2) screws holding the convection motor mounting plate to the convection fan motor.
14. Remove the single (1) screw and nut holding the fan thermo angle to the convection fan motor.
15. Now, the convection fan motor is free.

TURNTABLE MOTOR REMOVAL

1. Disconnect the oven from power supply.
2. Remove single (1) screw holding the bottom plate cover to the bottom plate and remove the cover
3. Disconnect wire leads from the turntable motor.
4. Remove the two (2) screws holding the turntable motor to the turntable motor angle and remove the motor.
5. The turntable motor is now free.

GRILL HEATING ELEMENT REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the single(1) screw holding the steam duct to oven cavity and release the tab of the steam duct from the hole of the oven cavity.
3. Remove the steam duct from the oven cavity.
4. Make the eight (8) tabs of the oven cavity straight.
5. Remove the thermal cover grill with sliding it.
6. Remove the single (1) screw holding the grill heating element cover to the oven cavity.
7. Remove the tgrill heating element cover.
8. Disconnect the leads from the grill heating elements.
9. Remove the two (2) screws holding the short-plate to the grill heating elements.
10. Now the grill heating elements are free.

MAINS RELAY, RELAY UNIT AND NOISE FILTER REMOVAL

FILTER REMOVAL

1. CARRY OUT 3D CHECKS.
2. Remove the single (1) screw holding the earth wire leads and magnetron duct to the magnetron 2.
3. Remove the single (1) screw holding the relay unit angle to the rear cabinet.
4. Remove the single (1) screw holding the relay unit angle to the inverter unit angle.
5. Release the tab of relay unit angle from inverter unit angle, and draw out the relay unit assembly from the oven.

MAINS RELAY

6. Disconnect the leads from mains relay.
7. Remove the single (1) screw holding the mains relay to the relay unit angle.
8. Now, the mains relay is free.

RELAY UNIT

9. Disconnect the leads from the relay unit, referring to "POSITIVE LOCK CONECTOR REMOVAL".
10. Remove the single (1) screw holding the relay unit to the relay unit angle.
11. Remove the relay unit from the relay unit angle.

NOISE FILTER

1. Disconnect the leads from the noise filter, referring to "POSITIVE LOCK CONECTOR REMOVAL".
2. Remove the single (1) screw holding the noise filter to the relay unit angle.
3. Remove the noise filter from the relay unit angle.

OVEN LAMP SOCKET REMOVAL

1. CARRY OUT 3D CHECKS.
2. Lift up the oven lamp socket.
3. Pull the wire leads from the oven lamp socket by pushing the terminal hole of the oven lamp socket with the flat type small screw driver.
4. Now, the oven lamp socket is free.

CAUTION: When replacing the oven lamp socket, replace it so that the side where the black dot is put faces upward.

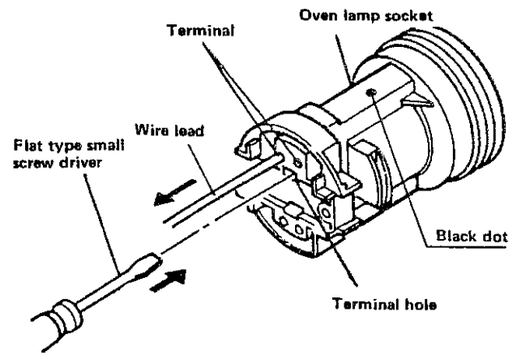


Figure C-5. Oven lamp socket

1ST LATCH, 2ND LATCH, 3RD LATCH, STOP AND MONITOR SWITCHES REMOVAL

1. CARRY OUT 3D CHECKS.
2. Disconnect the leads from the damper motor and damper switch.
3. Make the three tabs straight holding the damper duct assembly to the oven cavity.
4. Remove the single (1) screw holding the damper duct assembly to the oven cavity, and remove the damper duct assembly.
5. Disconnect the wire leads from the all switches on latch hook.
6. Remove the two (2) screws holding the latch hook to the oven cavity flange, and remove the latch hook.

(For removing 2nd latch switch, monitor switch or stop switch)

7. Push the retaining tab slightly and remove the switch from the latch hook.

(For removing the 1st and 3rd latch switches)

8. Remove the two (2) screws and nuts holding the switches to latch hook. Now, they are free.

Re-install

1. Re-install the 2nd latch switch, stop switch and monitor switch in place, referring to Figure C-6
2. Re-install the 1st latch switch and 3rd latch switch in place with the two (2) screws and nuts, referring to Figure C-6
3. Re-install the latch hook to the oven cavity flange with the two (2) screws.
4. Re-connect the wire leads to each switch, referring to chapter "Pictorial Diagram" correctly.
5. Re-install the damper duct assembly to the oven cavity with a screw and the three (3) tabs.
5. Re-connect the leads to damper motor and damper switch.
7. Make sure that each switch operates properly, referring to chapter "Test Procedure", and "Switches Adjustment".

1ST LATCH, 2ND LATCH, 3RD LATCH, STOP AND MONITOR SWITCHES ADJUSTMENT

If the 1st latch and stop switches, 2nd latch switch, 3rd latch switch and monitor switch do not operate properly due to a mis-adjustment, the following adjustment should be made.

1. CARRY OUT 3D CHECKS
2. Loosen the two (2) screws holding the latch hook to the oven cavity front flange.
3. With door closed, adjust the latch hook by moving it back and forwod, or up and down. In and out play of the door allowed by the latch hook should be less than 0.5 mm. The horizontal position of the latch hook should be placed where the 2nd latch switch and monitor switch have activated with the door closed.
   The vertical position of the latch hook should be placed where the 1st latch and stop switches and 3rd latch switch have activated with the door closed.
4. Secure the screws with washers firmly.
5. Make sure of the 1st latch switch, 2nd latch switch 3rd latch and stop switches and monitor switch operation. If those switches have not activated with the door closed, two (2) screws holding latch hook to oven cavity front flange and adjust the latch hook position.

After adjustment, make sure of following:

1. In and out play of door remains less than 0.5 mm when latched position. First check latch hook position, pushing and pulling the door toward the oven face. The results (plays of the door) should be less than 0.5mm.
2. The 1st latch switch and 3rd latch and stop switch interrupt the circuit before the door can be opened.
3. The monitor switch contacts close when the door is opened.
4. Re-install outer case and check for microwave leakage around the door with an approved microwave survey meter. (Refer to Microwave Measurement Procedure.)

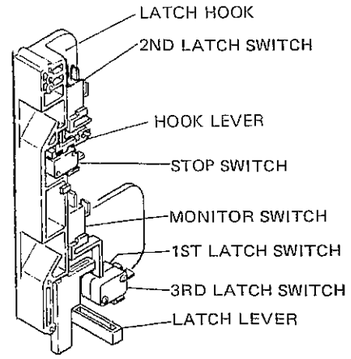


Figure C-6. Latch Switches Adjustment

DOOR REPLACEMENT AND ADJUSTMENT

DOOR REPLACEMENT

1. CARRY OUT 3D CHECKS
2. Remove five (5) screws holding the upper and lower oven hinge to the oven cavity. The lower oven hinge is now free.
3. Remove door assembly with upper oven hinge by pulling it forward.
4. Separate the door assembly and upper oven hinge. Door assembly is now free.
5. Re-install upper oven hinge to the new door assembly.
6. On re-installing new door assembly, secure the upper and lower oven hinges with the five (5) mounting screws to the oven cavity. Make sure the door is parallel with bottom line of the oven face plate and the latch head pass through the latch holes correctly.
7. CARRY OUT 4R CHECKS

Note: After any service to the door, and approved microwave survey meter should be used to assure in compliance with proper microwave radiation standards. (Refer to Microwave Measurement Procedure.)

DOOR ADJUSTMENT

When removing and/or loosening hinges such as in door replacement, the following adjustment criteria are taken. Door is adjusted to meet the following three conditions by keeping screws of hinge loose.

1. Adjust door latch heads at a position where they smoothly catch the latch hook through the latch holes. Refer to latch switch adjustments.
2. Deviation of the door alignment from horizontal line of cavity face plate is to be less than 1.0mm.
3. The door is positioned with its face depressed toward the cavity face plate.
4. Reinstall outer case and check for microwave leakage around the door with an approved microwave survey meter. (Refer to Microwave Measure ment Procedure.)

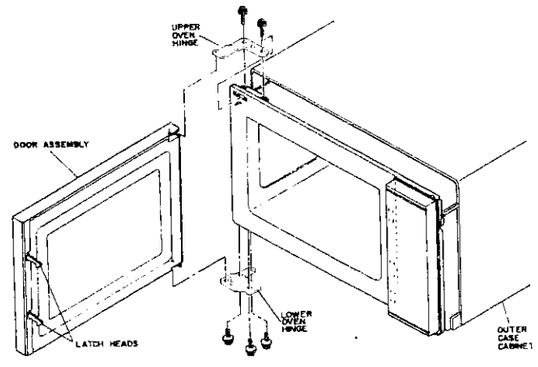


Figure C-7. Door Assembly Replacement and Adjustment

CHOKE COVER REMOVAL

1. Insert an iron plate(thickness of about 0.5mm) or flat type screw driver to the gap between the choke cover and door panel as shown figure to free the engagind part.
2. Lift up the choke cover, now cover is free.

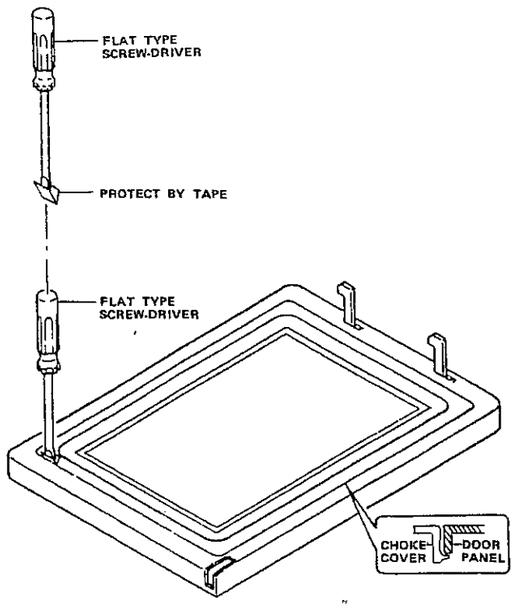


Figure C-8. Choke Cover Removal

1. Place the door assembly on a soft cloth with facing up.
2. Remove the choke cover, referring to "CHOKE COVER REMOVAL".
3. Remove the three (3) screws holding the door sash right to the door panel assembly.

DOOR SASH REMOVAL

4. Pull the middle part of the door sash right and release the lower tab of the door sash right from the door frame.
5. Release the upper tab of the door sash right from the door frame. Now, the door sash right is free.

DOOR GLASS REMOVAL

6. Slide the door glass to the right side until stopped by door frame.
7. Slide the door glass up until stopped by the door frame.
8. Release the lower part of the door glass from the door frame at first, and then release the upper part of the door glass from the door frame. Now, the door glass is free.

DOOR FRAME REMOVAL

9. Remove the nine (9) screws holding the door frame to the door panel.
10. Release the door frame from the door panel, now the door frame is free.

LATCH HEAD REMOVAL

11. Release the latch spring from the tabs of the door panel.
12. Release the latch spring from the latch head.
13. Release the latch head from the door panel.
14. Naw, the latch head is free.

DOOR PARTS REMOVAL

Remove the door assembly, referring to from item 1 through item 4 of "DOOR REPLACEMENT".

POSITION OF PURSE LOCKS AND WIRE TIE

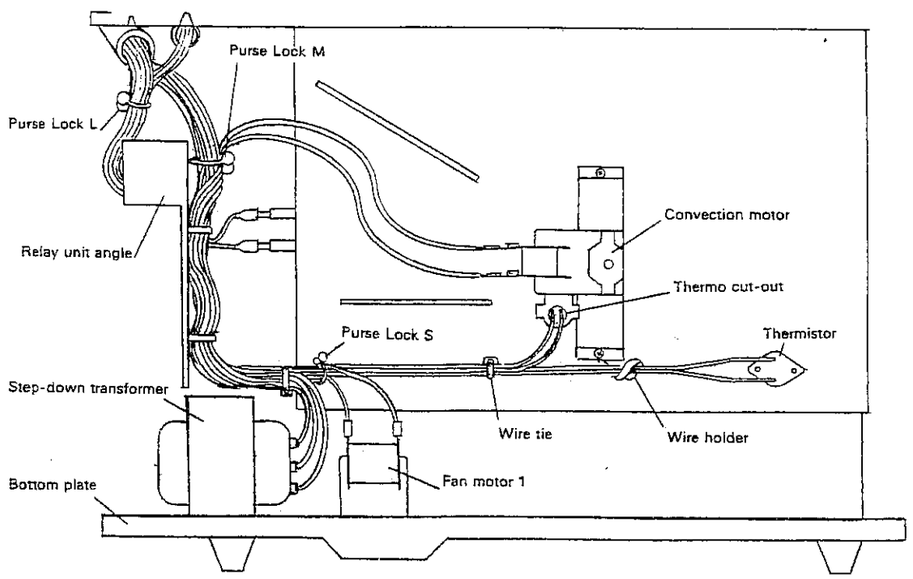


Figure R-1. The position of purse lock and wire tie
(View of rear side without rear cabinet)

MICROWAVE MEASUREMENT

After adjustment of door latch switches, monitor switch and door are completed individually or collectively, the following leakage test must be performed with a survey instrument and it must be confirmed that the result meets the requirements of the performance standard for microwave oven.

REQUIREMENT

The safety switch must prevent microwave radiation emission in excess of 5mW/cm2 at any point 5cm or more from external surface of the oven.

PREPARATION FOR TESTING:

Before beginning the actual test for leakage, proceed as follows;

1. Make sure that the test instrument is operating normally as specified in its instruction booklet.
   Important:
   Survey instruments that comply with the requirement for instrumentations as prescribed by the performance standard for microwave ovens must be used for testing.
   Recommended instruments are:
   NARDA 8100
   NARDA 8200
   HOLADAY HI 1500
   SIMPSON 380M
2. Place the oven tray into the oven cavity.
3. Place the load of 275 ±15ml of water initially at 20 ±5 °C in the center of the oven tray. The water container should be a low form of 600 ml beaker with inside diameter of approx. 8.5cm and made of an electrically non-conductive material such as glass or plastic.
   The placing of this standard load in the oven is important not only to protect the oven, but also to insure that any leakage is measured accurately.
4. Close the door and turn the oven ON with the timer set for several minutes. If the water begins to boil before the survey is completed, replace it with 275ml of the cool water.
5. Move the probe slowly (not faster that 2.5cm/sec.) along the gap.
6. The microwave radiation emission should be measured at any point of 5cm or more from the external surface of the oven.

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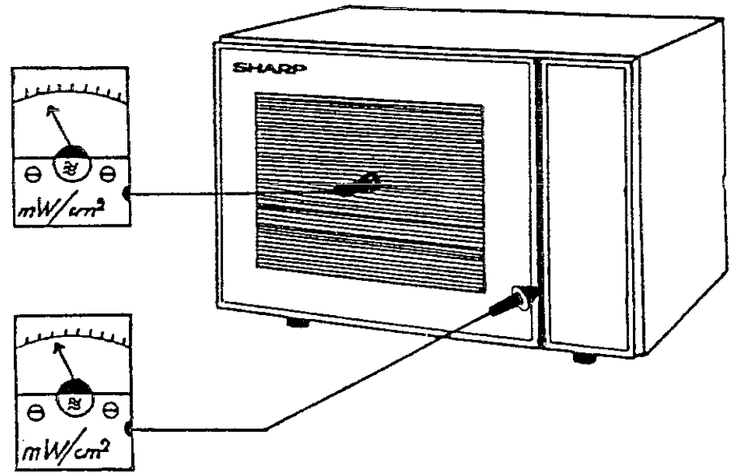


Microwave leakage measurement at 5 cm distance

TEST DATA TABLE

Parts	Symbol	Value / Data
Fuse	F1, F2, F3	F6.3A
20A special fuse		20A
Surge resistor	R2	10 Ω 20W
Monitor resistor	R1	3.6 Ω 10W
Temp. fuse	TF1	Off at 150 °C
Temp. fuse	TF2	Off at 150 °C
Thermal cut-out	TC1	Off at 115 °C / On at -20 °C
Thermal cut-out	TC2	Off at 145 °C / On at -20 °C
Thermal cut-out	TC3	Off at 150 °C / On at 120 °C
Mains relay	RY1	Approx. 75 Ω
Grill heating elements	GH+GH	Approx. 48 Ω (500W x 2) Insulation resistance > 10M Ω
Convection heating element	CH	Approx. 30 Ω , Insulation resistance > 10M Ω
Oven lamp	OL	230V 25W E14
High voltagr capacitor	C	0.95 µF AC 1900V
Thermistor		Approx. 326 k Ω -- 175 k Ω at 20 °C -- 30 °C
Magnetron	MG1 MG2	Filament < 1 Ω Filament — chassis ∞ ohm.
Power transformer	T1	Filament winding < 1 Ω Secondary winding Approx. 110 Ω Primary winding Approx. 2.09 Ω
Step-down transformer	T2	Approx. 1.5 Ω between 0 -- 120 V Approx. 2.8 Ω between 0 -- 220 V

TEST POINTS ON CONTROL UNIT (on "ON" CONDITION)

In/Out put terminal	Test point	Volt	Resistance (Disconnect the power plug)
Input terminal (power suplly)	A5 — A7	220V	Approx. 683 Ω
Input terminal (stop switch)	E1 — E2		0
Input terminal (Themistor)	E4 — E5	DC. 5V	Approx. 91k Ω at 20 °C -- 30 °C
Input terminal (Damper switch)	E2 — E3		0
Output terminal (Grill heating element)	A7 — C5	220V	∞
Output terminal (Convection heating element)	A7 — C10	220V	∞
Output terminal (Oven lamp)	A7 — B5	220V	∞
Output terminal (Fan motor 1 and 2)	A7 — B9	220V	∞
Output terminal (Turntable motor)	A7 — B1	220V	∞
Output terminal (Damper motor)	A7 — A1	220V	∞
Output terminal (Rotisserie motor)	A7 — B3	220V	∞
Output terminal (Convection fan motor)	A7 — B7	220V	∞
Output terminal (Power transformer)	A7 — C1	220V	∞
Output terminal (Mains relay)	E9 — E10	DC. 12V	Approx. 75 Ω
Output terminal (Earth)	E2 — Chassis		0

WARNING: DISCONNECT THE PLUG WHEN MEASURING RESISTANCE.

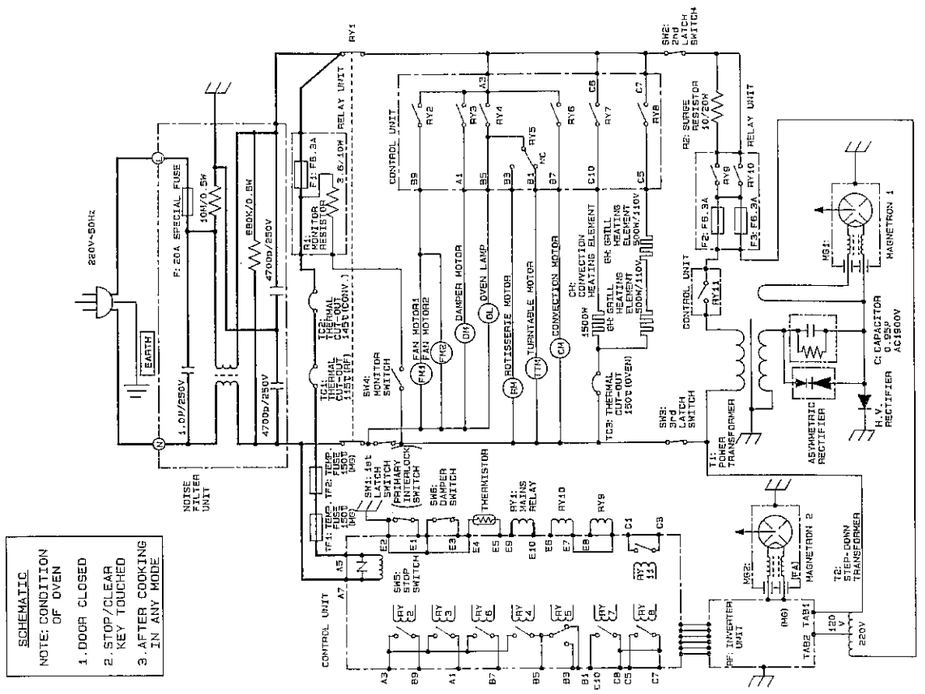


Figure O-1 (b). Oven Schematic — Off Condition after cooking
(The relay RY1 is in ON condition.)

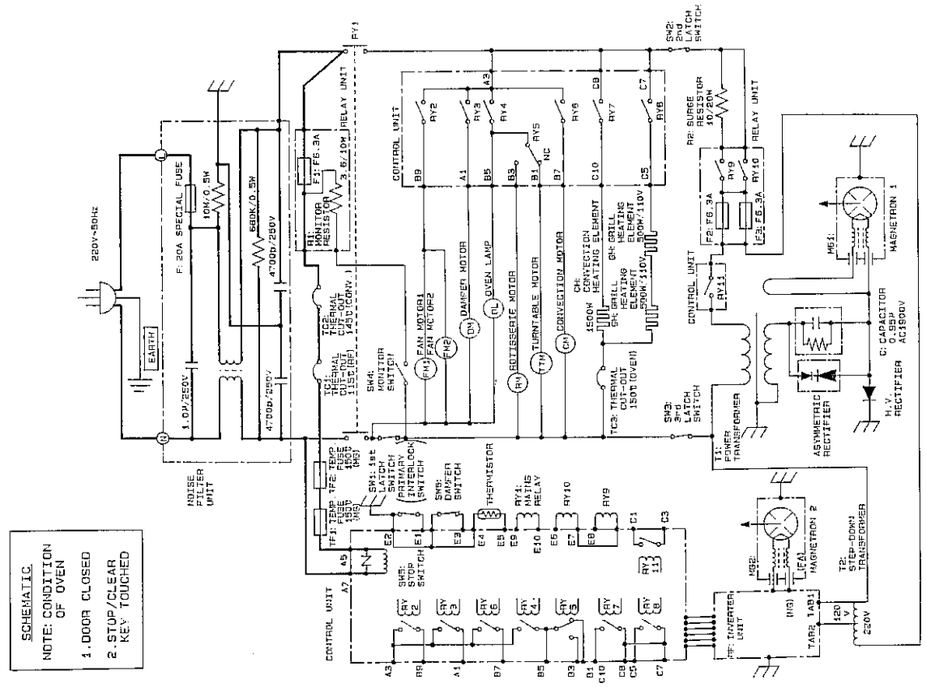


Figure O-1 (a). Oven Schematic — Off Condition after plugged
(The relay RY1 is also in OFF condition.)

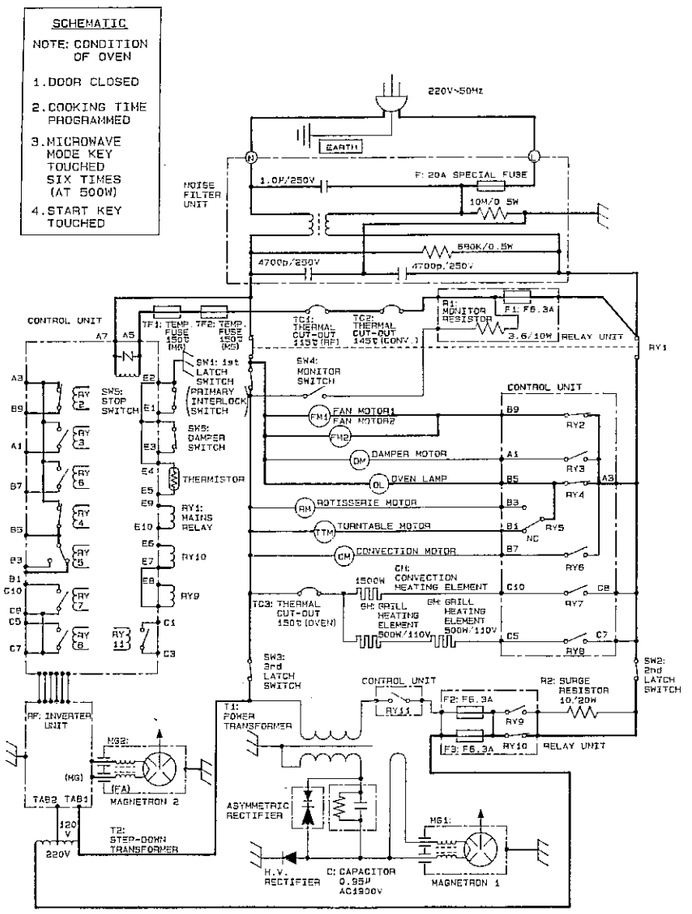


Figure O-2 (a). Oven Schematic — Microwave Cooking Condition (When the microwave output power level is set at less than 500W.)

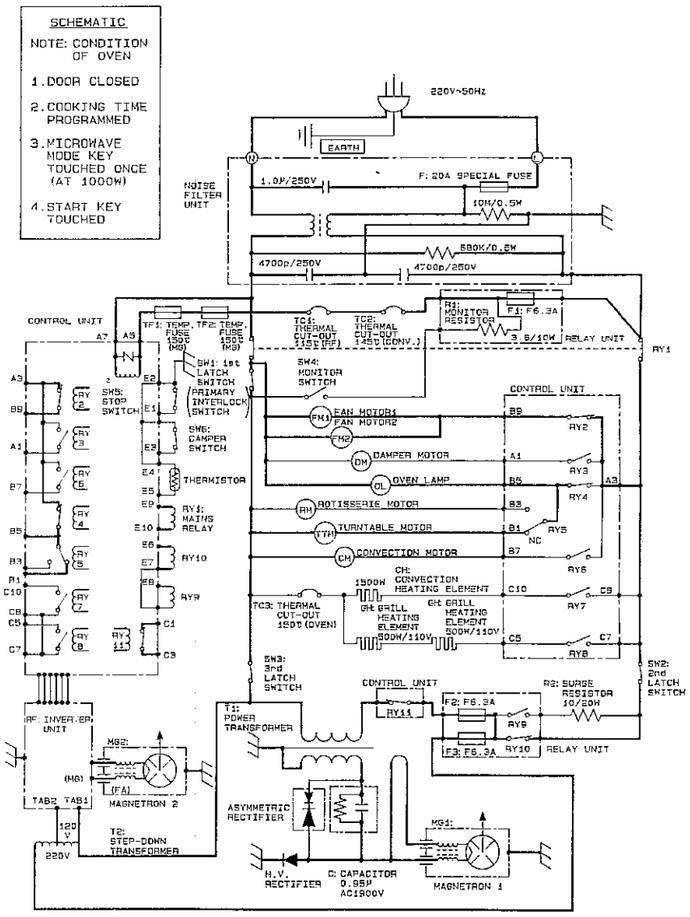


Figure O-2 (b). Oven Schematic — Microwave Cooking Condition (When the microwave output power level is set at more than 600W.)

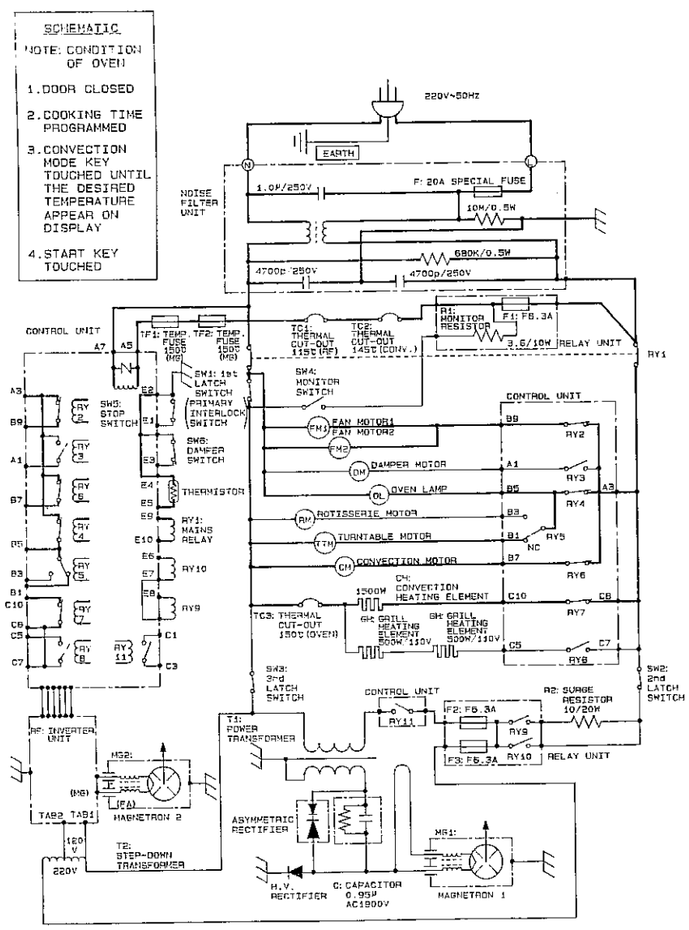


Figure O-3. Oven Schematic — Convection Cooking Condition

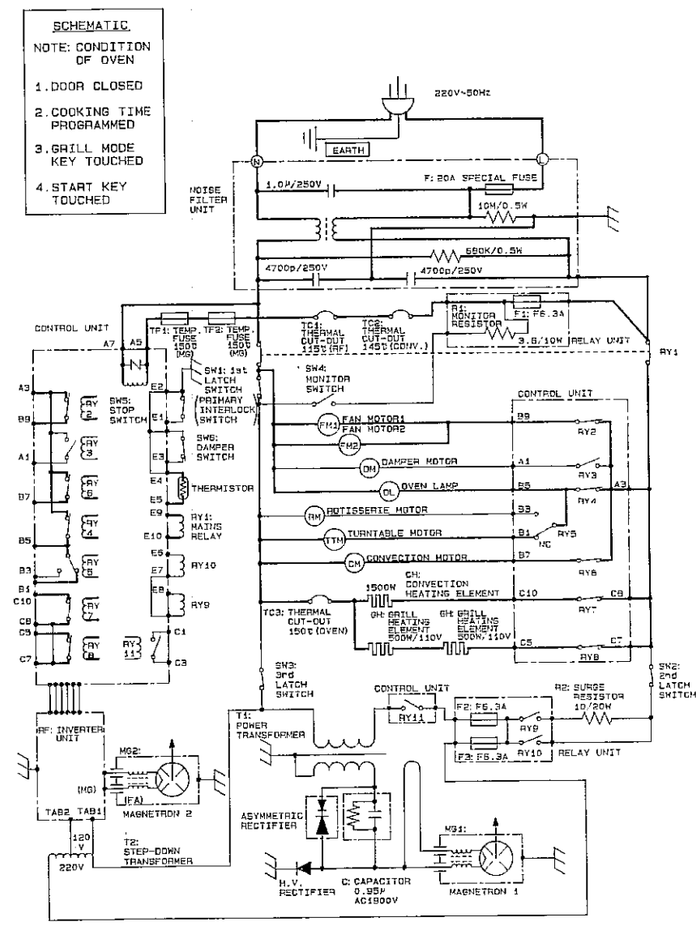


Figure O-4 (a). Oven Schematic — Grill Cooking Condition (When the temperature of the oven cavity is below 215°C.)

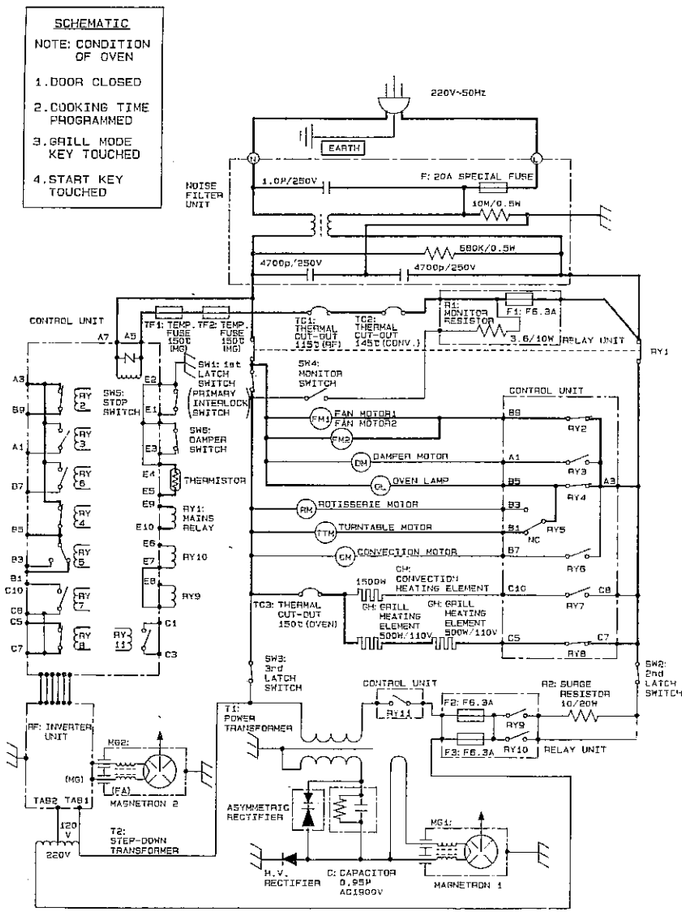


Figure O-4 (b). Oven Schematic — Grill Cooking Condition (When the temperature of the oven cavity is above 215°C.)

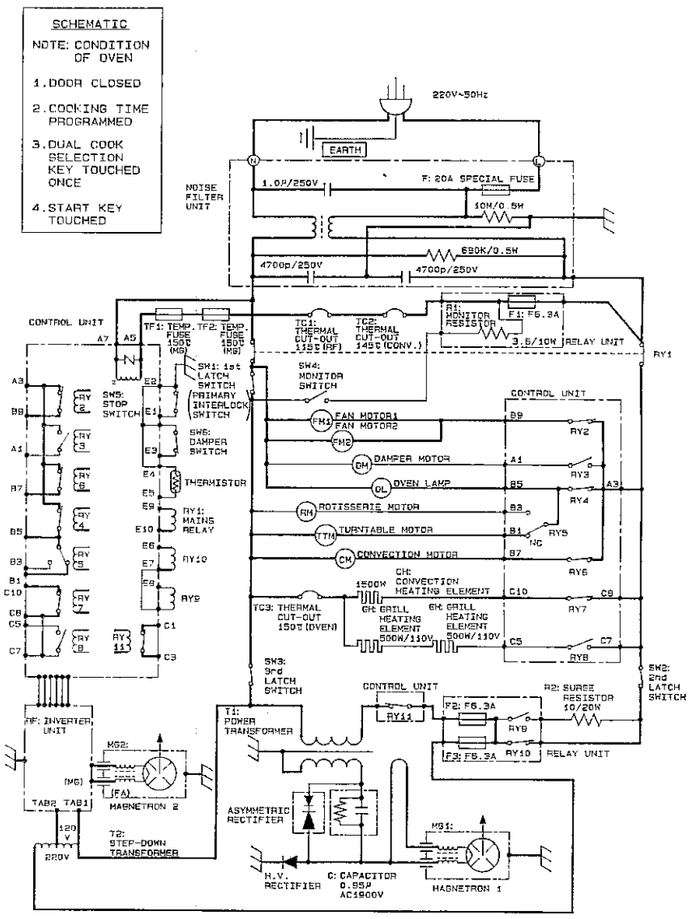


Figure O-5. Oven Schematic — Dual 1 Cooking (Microwave and Convection) Condition (Microwave output power is set at 900W and oven temperature is set at 250°C.)

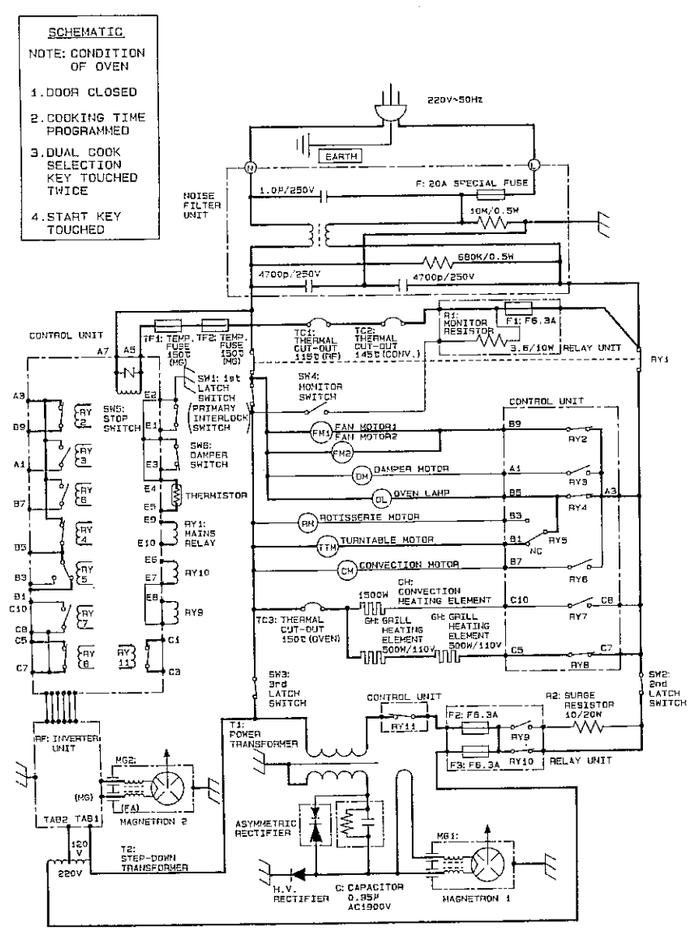


Figure O-6. Oven Schematic — Dual 2 Cooking (Microwave and Grill) Condition (Microwave output power is set at 1000W.)

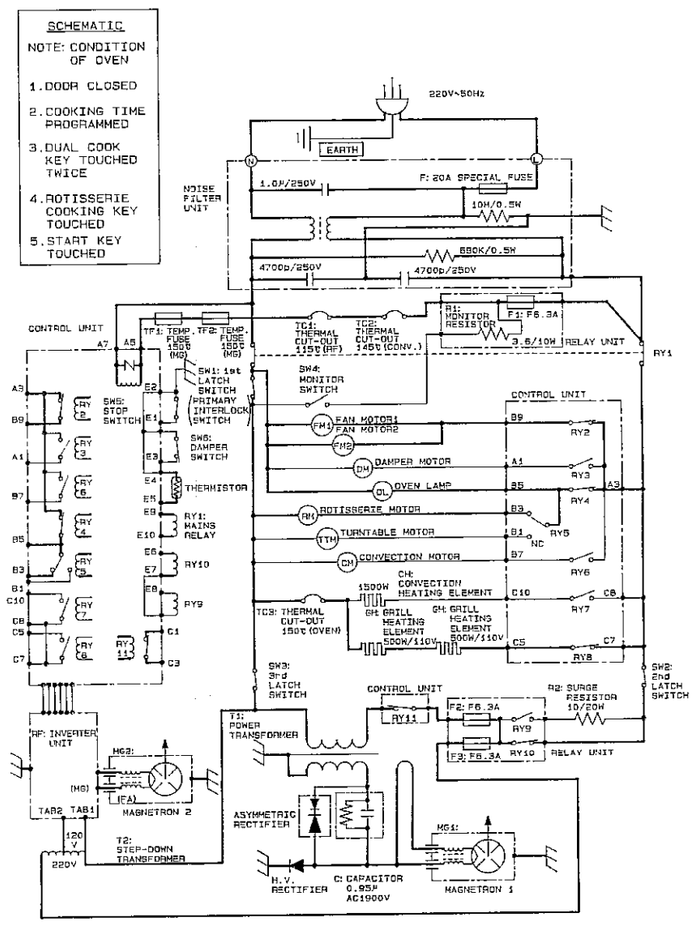


Figure O-7. Oven Schematic — Rotisserie Cooking on Dual 2 Cooking

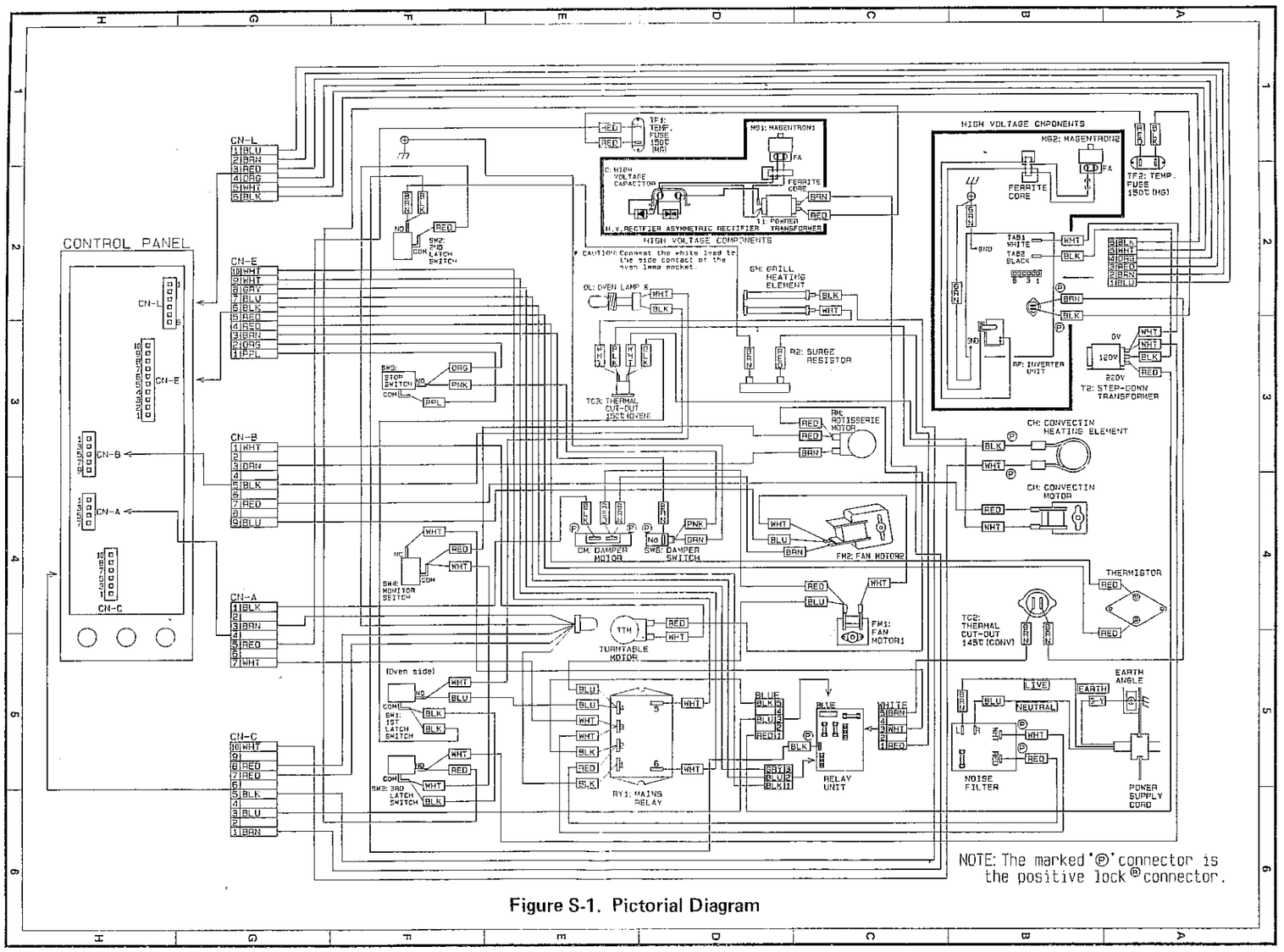


Figure S-1. Pictorial Diagram

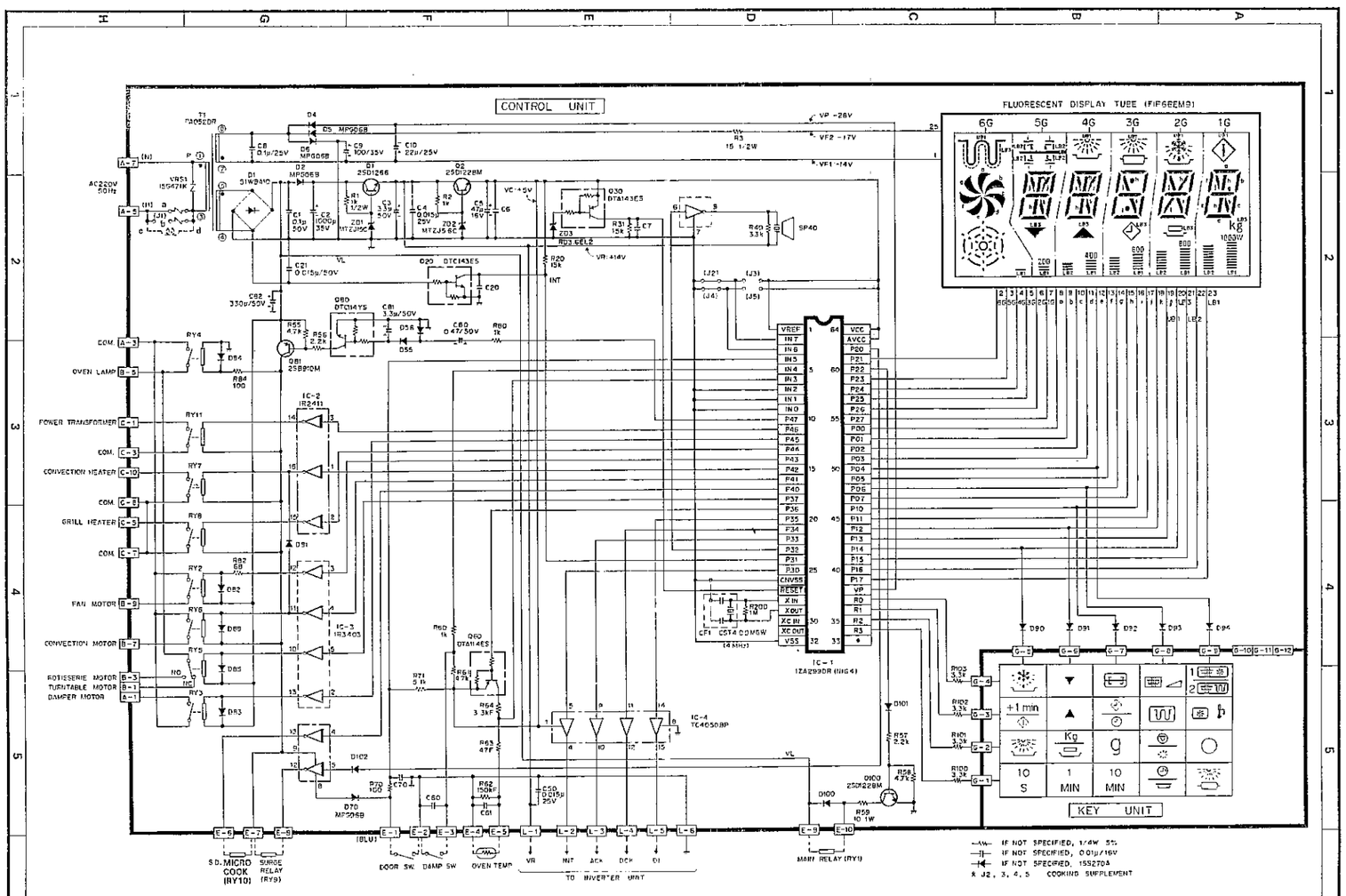


Figure S-2. Control Panel Circuit

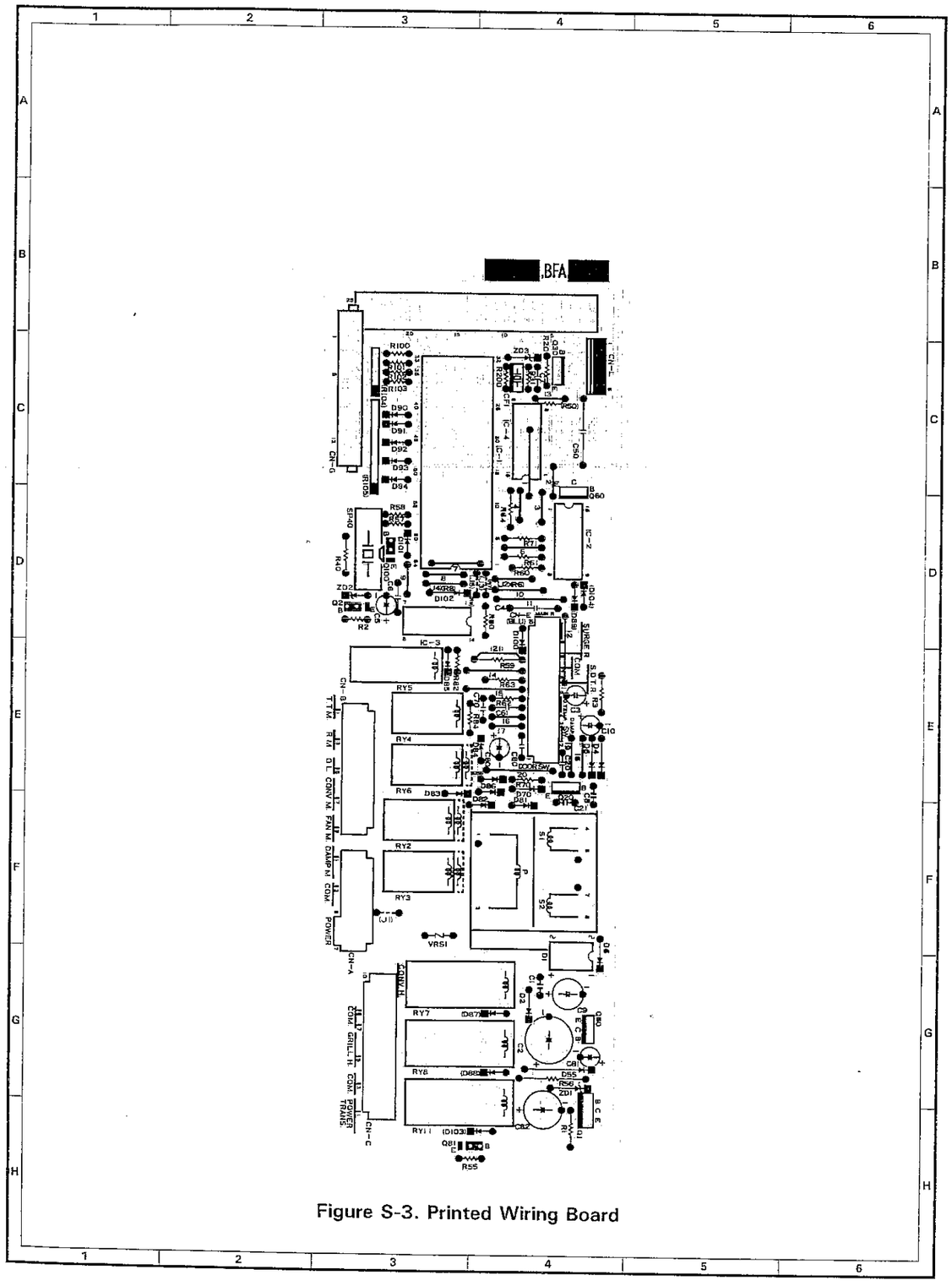


Figure S-3. Printed Wiring Board

PARTS LIST

Note : The parts marked "*" are used in voltage more than 250V.

	REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
			ELECTRIC PARTS		
*	RF	DPWBFA681WRK0	Inverter unit	1	BT
	F1	QFS-CA011WRE0	Fuse F6.3A	1	AC
	F2	QFS-CA011WRE0	Fuse F6.3A	1	AC
	F3	QFS-CA011WRE0	Fuse F6.3A	1	AC
	F	QFS-AA008WRE0	20A special fuse	1	AF
	TF1	QFS-TA013WRE0	Temp.fuse 150 °C (MG.)	1	AG
	TF2	QFS-TA013WRE0	Temp.fuse 150 °C (MG.)	1	AG
	TC1	RTHM-A017WRE0	Thermal cut-out 115 °C (RF)	1	AF
	TC2	RTHM-A025WRE0	Thermal cut-out 145 °C (CONV.)	1	AG
	TC3	RTHM-A039WRE0	Thermal cut-out 150 °C (OVEN)	1	AK
	SW1	QSW-MA047WRE0	1st latch switch	4	AF
	SW2	QSW-MA047WRE0	2nd latch switch	4	AF
	SW3	QSW-MA047WRE0	3rd latch switch	4	AF
	SW4	QSW-MA048WRE0	Monitor switch	1	AG
	SW5	QSW-MA047WRE0	Stop switch	4	AF
	SW6	QSW-MA047WRE0	Damper switch	1	AF
	CH	RHET-A084WRE0	Convection heating element	1	AF
	GH	RHET-A081WRE0	Grill heating element	2	AV
	TTM	RMOTDA099WRE0	Turntable motor	1	AQ
	DM	RMOTDA124WRE0	Damper motor	1	AP
	RM	RMOTDA125WRE0	Rotisserie motor	1	AP
	CM	RMOTEA187WRE0	Convection motor, Class B	1	AW
	FM1	RMOTEA194WRE0	Fan motor 1, Class B	1	AW
	FM2	FMOTEA198WRK0	Fan motor assembly 2 for cooling magnetron	1	AZ
	RY1	RRLY-A015WRE0	Mains relay	1	AQ
	OL	RLMPTA028WRE0	Oven lamp	1	AL
*	R2	RR-WZ0026WRE0	Surge resistor 10 Ω/20W	1	AH
*	C	RC-QZA096WRE0	High voltage capacitor	1	AV
*	T1	RTRN-A265WRE0	Power transformer	1	BK
	T2	RTRN-A266WRE0	Step-down transformer	1	BF
*	MG1	RV-MZA423WRE0	Magnetron 1	1	BF
*	MG2	~~RV-MZA032WRE0~~	Magnetron 2 FV-MZA032W2KP	1	BG
	1- 1	QSOCLA011WRE0	Oven lamp socket	1	AH
	1- 2	FPWBFA203WRE0	Relay unit	1	AV
	1- 3	FPWBFA207WRE0	Noise filter	1	AW
	1- 4	QACCVA043WRE0	Power supply cord	1	AW
	1- 5	FH-HZA011WRE0	Thermistor	1	AH
*	1- 6	FW-QZA060WRK0	High voltage rectifier assembly	1	AQ
	1- 7	RFIL-A001WRE0	Ferrite core	1	AG
			CABINET PARTS		
	2- 1	MHNG-A217WRM0	Lower oven hinge	1	AF
	2- 2	GBDYRA009WRW0	Rear cabinet	1	AT
	2- 3	GCOVHA221WRW0	Bottom plate cover	1	AB
	2- 4	FFTASA033WRK0	Oven lamp access cover,complete (White)	1	AH
		FFTASA034WRK0	Oven lamp access cover,complete (Brown)	1	AH
	2-4-1	GFTASA032WRP0	Oven lamp access cover (White)	1	AF
		GFTASA033WRP0	Oven lamp access cover (Brown)	1	AF
	2-4-2	PCUSGA077WRP0	Cushion	1	AD
	2-4-3	PSLDPA001WRP0	Lamp reflector	1	AC
	2- 5	GCABUA293WRP0	Outer case cabinet (White)	1	BB
		GCABUA296WRP0	Outer case cabinet (Brown)	1	BB
	2- 6	PCAPH0030WRE0	Cabinet cap (White)	2	AB
	2- 6	PCAPH0023WRE0	Cabinet cap (Brown)	2	AB
	2- 7	GDAI-A154WRW0	Bottom plate	1	AX
	2- 8	GLEGPA003WRE0	Foot	4	AB
	2- 9	PDUC-A392WRW0	Exhaust duct	1	AK
	2-10	PCUSGA023WRP0	Cushion	2	AA
	2-11	PCUSGA140WRE0	Cushion	1	AB

Note : The parts marked "*" are used in voltage more than 250V.

REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
		CONTROL PANEL PARTS		
3- 1	CPWBFA333WRK0	Control unit	1	BT
3- 1A	QCNCMA230DRE0	4-pin connector (A)	1	AC
3- 1B	QCNCMA227DRE0	5-pin connector (B)	1	AC
3- 1C	QCNCMA229DRE0	6-pin connector (C)	1	AD
3- 1D	QCNCMA228DRE0	10-pin connector (E) Blue	1	AD
3- 1E	QCNCWA030DRE0	12-pin connector (G)	1	AE
3- 1F	QCNCMA044DRE0	6-pin connector (L)	1	AC
3- 1G	RV-KXA031DRE0	Fluorescent display tube	1	AX
C1	RC-KZA032DRE0	Capacitor 0.1 µF 50V	1	AB
C2	RC-EZA238DRE0	Capacitor 1000 µF 35V	1	AD
C3,81	RC-EZA226DRE0	Capacitor 3.3 µF 50V	2	AA
C4,50	VCKYB11EX153N	Capacitor 0.015 µF 25V	2	AA
C5	RC-EZA229DRE0	Capacitor 47 µF 16V	1	AB
C6,7,20, C60,61, C70	VCKYD11CY103N	Capacitor 0.01 µF 16V	6	AA
C8	RC-KZ104QDRE0	Capacitor 0.1 µF 25V	1	AB
C9	RC-EZA236DRE0	Capacitor 100 µF 35V	1	AB
C10	RC-EZA228DRE0	Capacitor 22 µF 25V	1	AB
C21	RC-KZA039DRE0	Capacitor 0.015 µF 50V	1	AA
C80	RC-EZA227DRE0	Capacitor 0.47 µF 50V	1	AA
C82	RC-EZA239DRE0	Capacitor 330 µF 50V	1	AD
CF1	RCRS-A010DRE0	Ceramic resonator (4.00MHz)	1	AD
D1	RSRCDA007DRE0	Diode (S1WBA10)	1	AD
D2,5,6, D70	VHDMPG06B//-1	Diode (MPG06B)	4	AA
D4,55, D56, D81-86, D90-94, D100-102	VHD1SS270A/-1	Diode (1SS270A)	17	AA
IC1	RH-IZA299DRE0	LSI	1	AW
IC2	RH-IZA134DRE0	IC (IR2411)	1	AE
IC3	VHIIR3403//-4	IC (1R3403)	1	AE
IC4	RH-IZA300DRE0	IC (TC4050BP)	1	AD
Q1	VS2SD1266//-4	Transistor 2SD1266	1	AD
Q2,Q100	RH-TZA039DRE0	Transistor 2SD1228M	2	AC
Q20	VSDTC143ES/-3	Transistor DTC143ES	1	AB
Q30	VSDTA143ES/1B	Transistor DTA143ES	1	AB
Q60	VSDTA114ES/-3	Transistor DTA114ES	1	AB
Q80	VSDTC114YS/-3	Transistor DTC114YS	1	AA
Q81	VS2SB910MR/-4	Transistor 2SB910M	1	AC
R1	VRD-B12HF102J	Resistor 1k Ω 1/2W	1	AA
R2,60,80	VRD-B12EF102J	Resistor 1k Ω 1/4W	3	AA
R3	VRD-B12HF150J	Resistor 15 Ω 1/2W	1	AA
R20,31	VRD-B12EF153J	Resistor 15k Ω 1/4W	2	AA
R40, R100-103	VRD-B12EF332J	Resistor 3.3k Ω 1/4W	5	AA
R55,58 R61	VRD-B12EF472J	Resistor 4.7k Ω 1/4W	3	AA
R56,57	VRD-B12EF222J	Resistor 2.2k Ω 1/4W	2	AA
R59	VRS-B13AA100J	Resistor 10 Ω(F) 1W	1	AA
R62	VRN-B12EK154F	Resistor 150k Ω(F) 1/4W	1	AA
R63	VRN-B12EK470F	Resistor 47 Ω(F) 1/4W	1	AA
R64	VRN-B12EK332F	Resistor 3.3k Ω(F) 1/4W	1	AA
R70,84,	VRD-B12EF101J	Resistor 100 Ω 1/4W	2	AA
R71	VRD-B12EF512J	Resistor 5.1k Ω 1/4W	1	AA
R82	VRN-B12EF680J	Resistor 68 Ω 1/4W	1	AA
R200	VRD-B12EF105J	Resistor 1M Ω 1/4W	1	AA
RY2-4,6	RRLY-A020DRE0	Relay (OJ-SH-112LM)	4	AH
RY5	RRLY-A044DRE0	Relay (VG-12S)	1	AH
RY7,8,11	RRLY-A049DRE0	Relay (VS12SMBU-NR)	3	AK
SP40	RALM-A007DRE0	Buzzer (PKM22EPT)	1	AF
T1	RTRNPA052DRE0	Transformer	1	AT
VRS1	RH-VZA010DRE0	Varistor (15G471K-T)	1	AE

Note : The parts marked "*" are used in voltage more than 250V.

REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
ZD1	VHEMTZJ15C/-1	Zener diode (MTZJ15C)	1	AA
ZD2	VHEMTZJ5.6C-1	Zener diode (MTZJ5.6C)	1	AA
ZD3	RH-EZA052DRE0	Zener diode (RD3.6EL2)	1	AB
3- 2	HPNLCA845WRR0	Control panel frame : R-10R50(W)	1	AP
	HPNLCA846WRR0	Control panel frame : R-10R50(B)	1	AP
3- 3	DUNTKA394WRK0	Key unit assembly : R-10R50(W)	1	BA
	DUNTKA395WRK0	Key unit assembly : R-10R50(B)	1	BA
3- 4	GMADIA044WRF0	Display filter	1	AD
3- 5	JBTN-A663WRF0	Open button : R-10R50(W)	1	AD
	JBTN-A664WRF0	Open button : R-10R50(B)	1	AD
3- 6	MSPRDA009WRE0	Open button spring	1	AA
3- 7	LANGTA248WRW0	Control panel back plate	1	AH
3- 8	MLEVFA042WRW0	Open lever	1	AC
3- 9	NSFTTA030WRE0	Open shaft	1	AB
3- 10	XEPSD30P10XS0	Screw; control unit mounting	3	AA
3- 11	XCPSD40P10000	Screw; control panel back plate mounting	2	AA
		OVEN PARTS		
4- 1	DOVN-A259WRY0	Oven cavity	1	BR
4- 2	LANGQA239WRW0	Oven lamp mounting plate	1	AF
4- 3	LFLG-A012WRE0	Rotisserie bearing	1	AG
4- 4	LFLG-A013WRE0	Bearing	1	AE
4- 5	PCOVPA201WRE0	Waveguide cover	2	AD
4- 6	PCOVQA012WRW0	Grill heating element cover	1	AM
4- 7	PDUC-A382WRW0	Steam duct	1	AK
4- 8	PFPF-A105WRE0	Thermal protection sheet bottom	1	AF
4- 9	PFPF-A106WRE0	Thermal protection sheet right	1	AM
4-10	PGLSPA255WRE0	Oven lamp screen glass	1	AE
4-11	PSKR-A202WRW0	Air guide	1	AC
4-12	PSKR-A208WRP0	Partition plate-s	1	AD
4-13	PSLDHA081WRW0	Thermal-cover grill	1	AG
4-14	PSLDHA082WRW0	Thermal-cover bottom	1	AG
4-15	PSLDHA083WRW0	Thermal-cover right	1	AK
4-16	LANGQA241WRW0	Inverter unit angle	1	AL
4-17	LANGQA248WRW0	Relay unit angle	1	AS
4-18	FSRAHA033WRY0	Turntable support	1	AL
4-19	LANGTA245WRW0	Chassis support	1	AE
4-20	MHNG-A107WRM0	Upper oven hinge	1	AE
4-21	MLEVPA085WRF0	Latch lever	1	AD
4-22	LANGQ0382WRM0	Earth angle	1	AB
4-23	PHOK-A030WRF0	Latch hook	1	AL
4-24	FDUC-A185WRY0	Convection fan duct	1	AW
4-25	PDUC-A383WRW0	Magnetron duct	1	AE
4-26	PSKR-A209WRP0	Partition plate T	1	AE
4-27	PSKR-A210WRP0	Partition plate B	1	AE
4-28	FDUC-A184WRY0	Damper duct assembly	1	AH
4-29	MCAMPA046WRF0	Damper cam	1	AC
4-30	NSFTTA074WRE0	Damper shaft	1	AE
4-31	PCUSGA255WRP0	Damper cushion	1	AC
4-32	PFTA-A020WRW0	Damper	1	AD
4-33	LANGQA234WRW0	Convection motor mounting plate	1	AE
4-34	LANGQA246WRW0	Fan thermo angle	1	AB
4-35	NFANMA011WRP0	Convection fan	1	AD
4-36	NFANMA012WRP0	Auxiliary fan	1	AC
4-37	PFPF-A121WRE0	Convection thermal protection sheet	1	AN
4-38	PGISHA017WRE0	Convection heater insulator (A)	2	AF
4-39	PGISHA018WRE0	Convection heater insulator (B)	1	AE
4-40	PSLDHA084WRP0	Thermal-cover rear	1	AN
4-41	LBNDKA015WRW0	Capacitor holder	1	AE
4-42	QTANNA006WRE0	Short-plate	1	AB
4-43	LANGQA240WRW0	Rotisserie motor angle	1	AK
4-44	NCPL-A034WRE0	Rotisserie coupling	1	AG
4-45	LANGQA236WRW0	Turntable motor angle	1	AK
4-46	MSPRPA064WRE0	Plate spring	1	AD
4-47	NCPL-A033WRE0	Turntable motor shaft	1	AE
4-48	PSPA-A056WRE0	Spacer	1	AB
4-49	FDUC-A186WRY0	Fan case assembly	1	AP
4-50	LANCQA237WRP0	Fan motor angle	1	AC

Note : The parts marked "*" are used in voltage more than 250V.

REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
4-51	LFLG-A014WRE0	Bearing	1	AG
4-52	NFANCA002WRE0	Cross-flow fan	1	AW
4-53	MLEVPA082WRF0	Hook lever	1	AC
4-54	PPIPFA004WRE0	Collar	1	AE
4-55	PCUSGA269WRE0	Cross-flow fan cushion A	1	AA
4-56	PCUSGA264WRP0	Cross-flow fan cushion B	1	AA
4-57	PCUSUA161WRP0	Cross-flow fan cushion C	1	AA
4-58	PCUSUA223WRP0	Cross-flow fan cushion D	1	AA
4-59	PCUSUA221WRP0	Thermal-cover bottom cushion	1	AB
4-60	PCUSUA222WRP0	Cross-flow fa cushion E	1	AA
4-61	PCUSU0265WRP0	Steam duct cushion	1	AD
4-62	PCUSUA220WRP0	Partition plate cushion	1	AA
4-63	PCUSUA224WRP0	Rubber partition	1	AA
4-64	PCOVPA216WRE0	High voltage cover	1	AE
4-65	PCUSGA268WRP0	Cushion	1	AB
4-66	PPACGA066WRP0	Cushion	1	AA
4-67	PPACGA069WRP0	Cushion	2	AB
4-68	PPACGA067WRP0	Cushion	1	AC
4-69	PCUSGA277WRP0	Botoom plate cushion	1	AA
4-70	PCUSGA278WRP0	Convection cushion	1	AB
4-71	PCUSGA209WRP0	tTransfomer cushion	1	AB

DOOR PARTS

5	CDORFA439WRK0	Door assembly,complete for R-10R50(W)	1	BP
	CDORFA445WRK0	Door assembly,complete for R-10R50(B)	1	BP
5- 1	DDORFA399WRY0	Door panel	1	BG
5- 2	FCOVHA023WRK0	Choke cover	1	AV
5- 3	GWAKPA148WRF0	Door frame for R-10R50(W)	1	AU
	GWAKPA149WRF0	Door frame for R-10R50(B)	1	AU
5- 4	HDECQA148WRF0	Door sash right for R-10R50(W)	1	AG
	HDECQA149WRF0	Door sash right for R-10R50(B)	1	AG
5- 5	LSTPPA086WRF0	Latch head	1	AE
5- 6	MSPRTA109WRE0	Latch spring	1	AA
5- 7	PGLSPA256WRE0	Door glass for R-10R50(W)	1	AZ
5- 7	PGLSPA259WRE0	Door glass for R-10R50(B)	1	AZ

MISCELLANEOUS

6- 1	TCAUHA082WRR0	Caution label	1	AC
6- 2	TCAUHA083WRR0	Belgium label	1	AB
6- 3	TCAUHA100WRR0	H.V. caushion	1	AC
6- 4	TSPCNB263WRR0	Name plate for R-10R50(W)	1	AC
	TSPCNB274WRR0	Name plate for R-10R50(B)	1	AC
6- 5	TSPCNB273WRR0	Model name label for R-10R50(W)	1	AB
	TSPCNB275WRR0	Model name label for R-10R50(B)	1	AB
6- 6	FAMI-A048WRM0	High rack	1	AP
6- 7	FAMI-A049WRM0	Low rack	1	AP
6- 8	FTNT-A023WRH0	Turntable	1	AT
6- 9	JHNDMA027WRT0	Skewer handle (Right)	1	AL
6-10	JHNDMA028WRT0	Skewer handle (Left)	1	AL
6-11	LANG-A009WRE0	Slide prongs	2	AE
6-12	LX-BZA059WRE0	Fan screw	2	AB
6-13	NSFTTA073WRE0	Skewer	1	AQ
6-14	PGISHA054WRE0	Ceramic skewer support	1	AG
6-15	TCADCA281WRR0	Cookbook for convection and grill cooking	1	AP
6-16	TCADCA282WRR0	Cookbook for microwave cooking	1	AT
6-17	TINS-A172WRR0	Operation manual in german, english and french	1	AG
6-18	TINS-A173WRR0	Operation manual in italian,spanish and dutch	1	AG
6-19	TLABMA252WRR0	Menu label for R-10R50(W)	1	AE
	TLABMA256WRR0	Menu label for R-10R50(B)	1	AE
6-20	TLABMA260WRR0	Menu sticker for easy defrost and easy reheat	1	AE
6-21	FW-VZA857WRE0	Low voltage harness	1	AU
6-22	LBNDK0018JBE0	Wire tie	2	AA
6-23	LHLDWQ002YBE0	Purse lock S	1	AA
6-24	LBNDKA058WRE0	Wire holder	3	AB
6-25	FW-VZA858WRE0	Main harness	1	BG
6-26	LHLDWQ004YBE0	Purse lock L	1	AA

Note : The parts marked "*" are used in voltage more than 250V.

REF. NO.	PART NO.	DESCRIPTION	Q'TY	CODE
6-27	LHLDWQ003YBE0	Purse lock M	1	AA

SCREW, NUTS AND WASHERS

7- 1	XCPSD30P06X00	Screw; 3mm x 6mm	10	AA
7- 2	LX-BZA061WRE0	Special screw	2	AC
7- 3	XCPSD40P06000	Screw; 4mm x 6mm	7	AB
7- 4	LX-BZA088WRE0	Special screw	1	AB
7- 5	LX-CZ0052WRE0	Special screw	14	AA
7- 6	XBTWW40P06000	Screw; 4mm x 6mm	6	AA
7- 7	LX-NZ0061WRE0	Special nut	3	AB
7- 8	XOTSC40P12000	Screw; 4mm x 12mm R-10R50(W)	4	AA
	XOTSB40P12000	Screw; 4mm x 12mm R-10R50(B)	4	AA
7- 9	XHPSD40P08000	Screw; 4mm x 8mm	13	AA
7-10	XHTSD40P08RV0	Screw; 4mm x 8mm	3	AB
7-11	XNESD40-32000	Nut ; 4mm x 3.2mm	1	AB
7-12	XOTSD40P12000	Screw; 4mm x 12mm	7	AB
7-13	XCPSD30P06XS0	Screw; 3mm x 6mm	2	AA
7-14	XHPSD40P08K00	Screw; 4mm x 8mm	4	AA
7-15	XOTSD40P10000	Screw; 4mm x 10mm	27	AA
7-16	LX-CZA020WRE0	Special screw	5	AA
7-17	LX-CZA038WRE0	Special screw	2	AA
7-18	LX-CZA046WRE0	Special screw	1	AB
7-19	XCPSD30P16X00	Screw; 3mm x 16mm	1	AA
7-20	LX-EZA036WRE0	Special screw	4	AA
7-21	XHTSD40P08000	Screw; 4mm x 8mm	13	AA
7-22	XBPSD40P08000	Screw; 4mm x 8mm	2	AA
7-23	XTPSD30P06000	Screw; 3mm x 6mm	2	AA
7-24	XBPSD40P20000	Screw; 4mm x 20mm	1	AA
7-25	XBTSD40P05000	Screw; 4mm x 5mm	2	AB
7-26	XBTWW40P12000	Screw; 4mm x 12mm	2	AA
7-27	XCPSD30P06000	Screw; 3mm x 6mm	6	AA
7-28	XCPWW30P08000	Screw; 3mm x 8mm	2	AA
7-29	XCPWW30P12X00	Screw; 3mm x 12mm	4	AA
7-30	XCTSD40P06000	Screw; 4mm x 6mm	2	AA
7-31	XCTWW40P12000	Screw; 4mm x 12mm	2	AA
7-32	XNEUW40-32000	Nut ; 4mm x 3.2mm	1	AB
7-33	XPSSP20-20000	Pin	1	AA
7-34	XWHUW40-08000	Washer; 4mm x 0.8mm	2	AB
7-35	XWHUW50-08000	Washer; 5mm x 0.8mm	1	AB
7-36	XWSUW40-10000	Washer; 4mm x 1.0mm	1	AB
7-37	XWVUW40-04000	Washer; 4mm x 0.4mm	2	AA
7-38	XHSSC40P08000	Screw; 4mm x 8mm R-10R50(W)	1	AB
	XHSSB40P08000	Screw; 4mm x 8mm R-10R50(B)	1	AB
7-39	XBPWW30P06K00	Screw; 4mm x 6mm	2	AA
7-40	XBPSD30P26K00	Screw; 3mm x 26mm	2	AA
7-41	XNESD30-24000	Nut ; 3mm x 2.4mm	2	AA

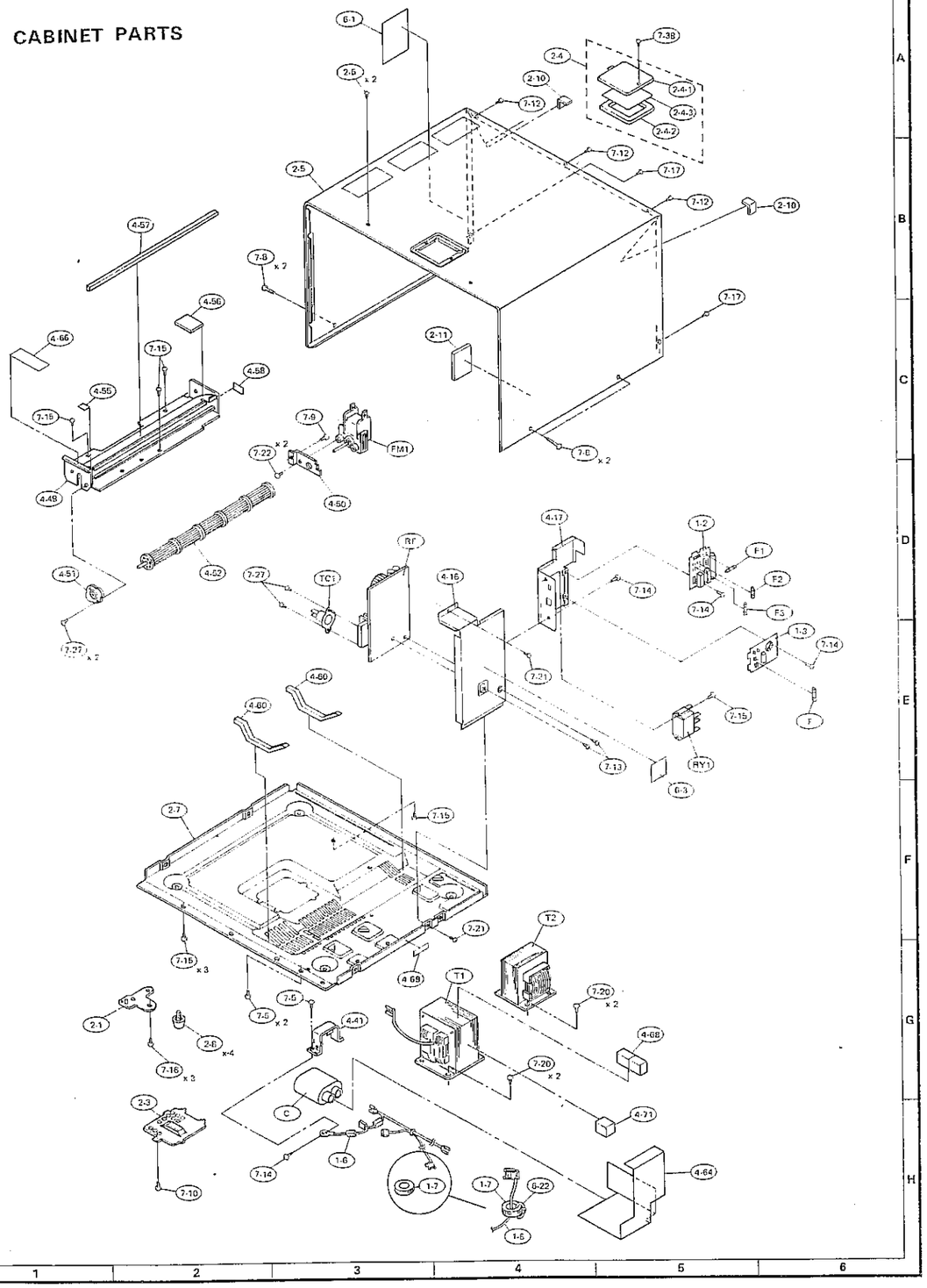
HOW TO ORDER REPLACEMENT PARTS

To have your order filled promptly and correctly, please furnish the following information.

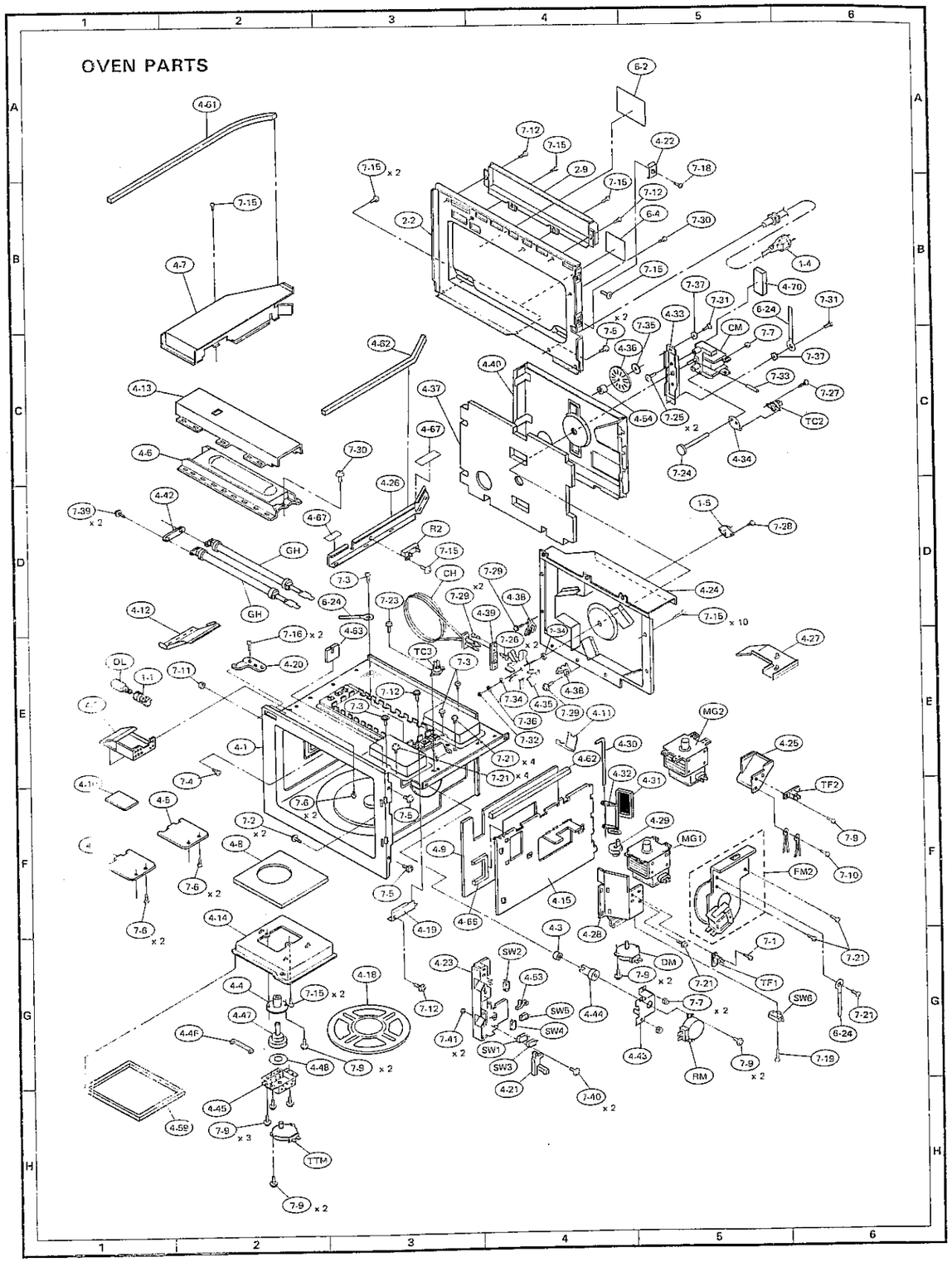
1. MODEL NUMBER
2. REF. NO.
3. PART NO.
4. DESCRIPTION

(RDP1303U)

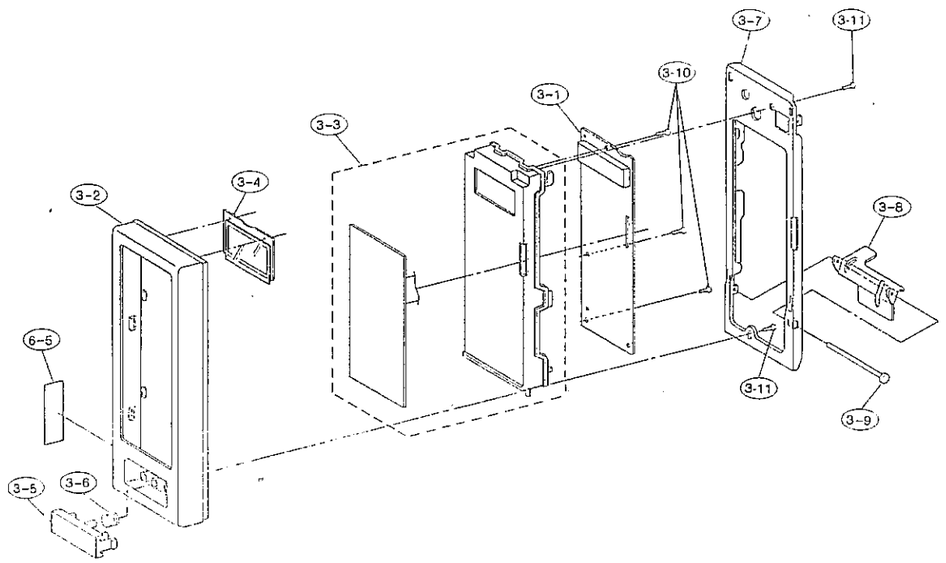
CABINET PARTS



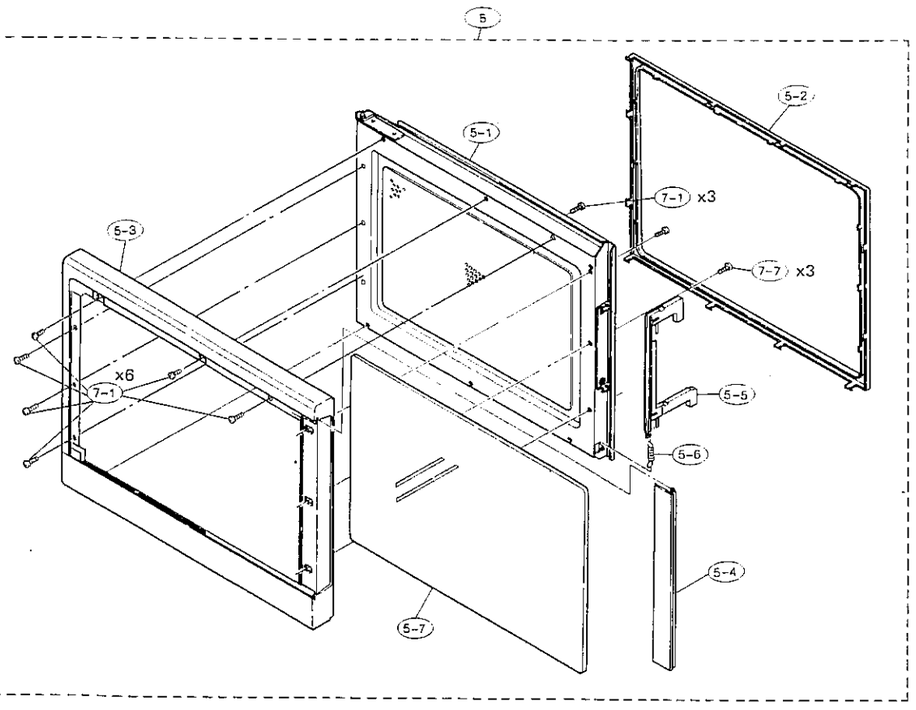
OVEN PARTS



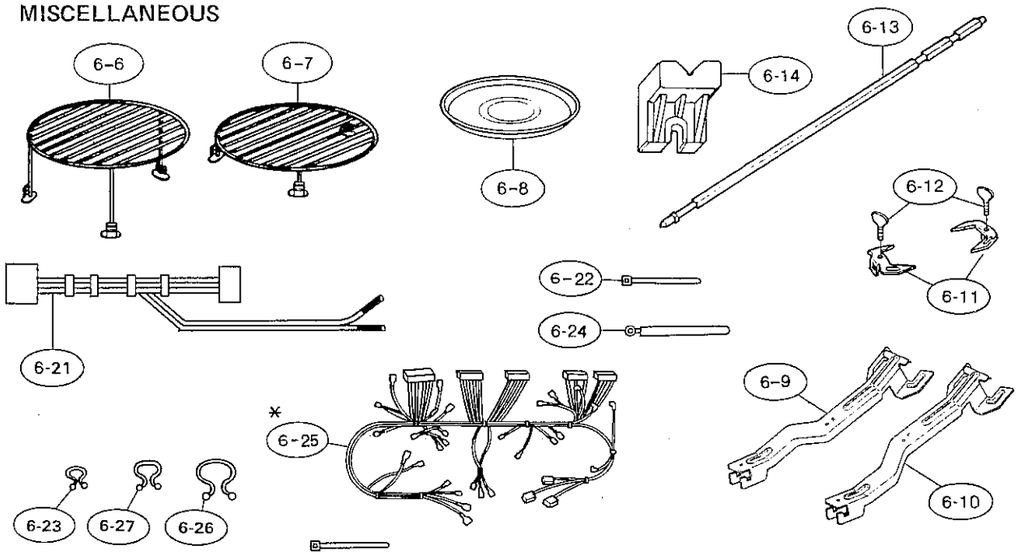
CONTROL PANEL PARTS



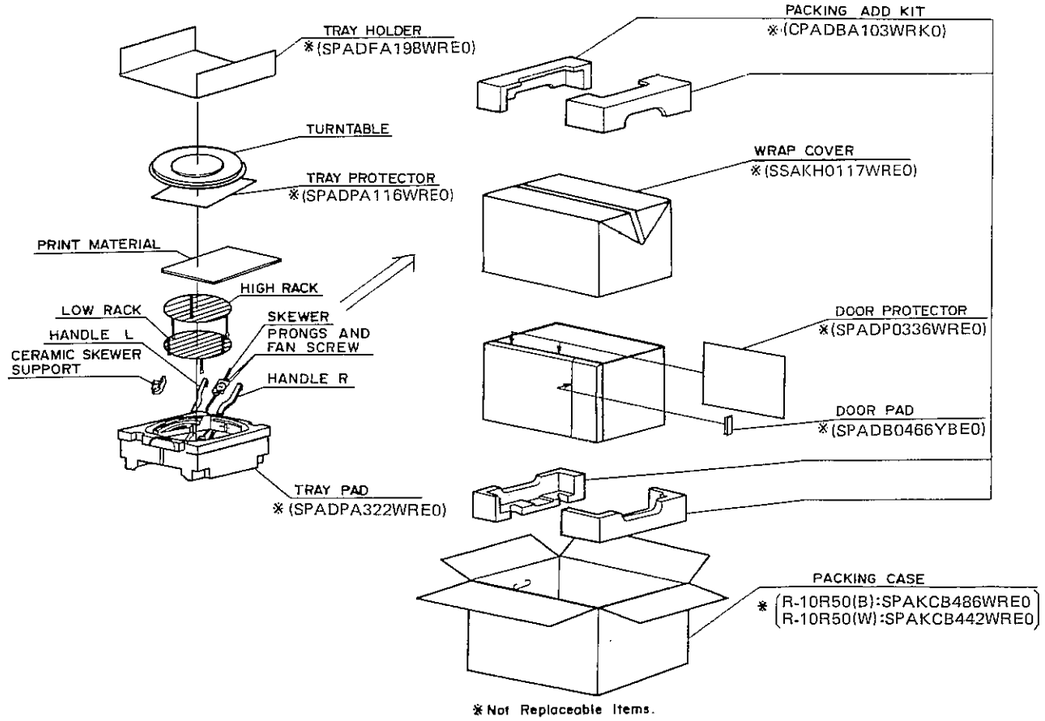
DOOR PARTS



MISCELLANEOUS



PACKING AND ACCESSORIES



※Not Replaceable Items.

[redacted]

10R50(W)
10R50(B)

(RDX1101U)

SHARP

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